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Aggregate Plants of Movable Type

Who Shall Operate Them?

By Edmund Shaw
Contributing Editor, Rock Products

THE movable or semi-portable plant is here and doing business. The question, as I see it, is not how shall we get rid of it, but how shall we adapt it to the needs of our industry. In other words, who is going to run such plants? Shall they be run by contractors, or amateurs who will break into the business because of our inertia, or are they to be run by commercial producers who know the business, who are able to give the public better materials at less cost?

A. C. Wright, president and principal owner of the Imperial Rock Corp., has been producing aggregates at Imperial, Calif., and other places for a number of years. The plant described is the twelfth that he has designed and operated. When the principal market for aggregates became that for state highway construction and most of these projects too far from permanent plants to make trucking profitable, he saw that the way to reach such a market was with a plant as near to the job as possible.

The job will require about 240,000 cu. yd. of aggregate; 200 tons per hour output was needed. The plant had to pay for itself; had to be of the movable type, that could be picked up and taken to the next job without too much loss in time and money.

Use Shovel and Motor Trucks

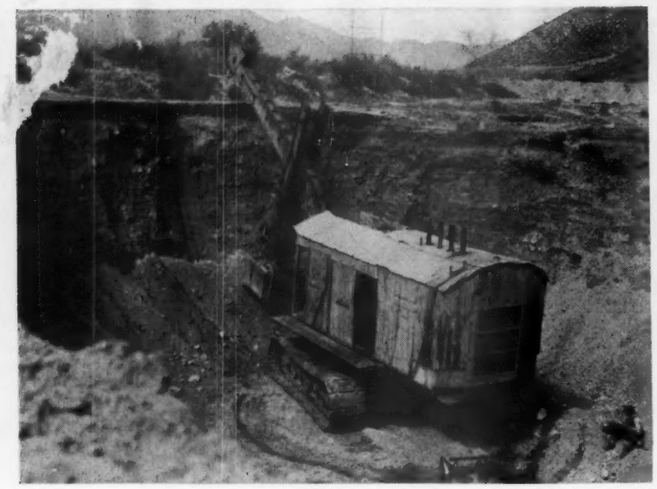
The deposit is at Castiac, in Ventura county, and it is what the writer would call of good average quality, presenting no especial problems in either excavating or preparing the materials for use. There are few large pieces, although there are enough "cobbles" to keep a crusher busy. Sand is in excess and the plant was designed so that this excess could be bypassed. Excavating is by a 50-B Bucyrus shovel, Diesel-engine driven, and the material is taken by trucks from the shovel to a hopper over a belt conveyor.

From this conveyor everything passes over an S.-A. double-deck vibrating screen, with 2½-in. and ½-in. openings. The oversize of the 2½-in. goes to either or both of two crushers, one a Telsmith 3F, the other a No. 3 Symons cone crusher. Only the first was in use at the time the plant was visited. The discharge of the crusher joins the product made between the screens, 2½ to ½-in., on the conveyor that feeds the washing plant and the undersize of the ½-in. screen goes to a splitting box. This has a flap valve at the bottom which can be set so as to throw any portion of the material (sand) to a cross conveyor that goes to a waste bunker. This is afterwards hauled to a dump by trucks. The remainder of the sand goes to the washing plant conveyor, and by this method only that amount of sand which is needed for fine aggregate is washed and screened.

The conveyor belt discharge is split between two 48-in. by 16-ft. revolving screens, one made by the Standard Steel Works, which supplied many parts of the plant, and one by the Stephens-Adamson Manufacturing Co. Both have 1-in. square holes and a jacket with $\frac{5}{16}$-in. holes. The materials which go to the bins are: Sand, $\frac{5}{16}$-in. down; medium aggregate, $\frac{5}{8}$ to 1-in.; and coarse aggregate, 1-in. to 2½-in. In the beginning a 1½-in. screen was used, but the 1-in. opening made a more even division of the material and made it easier to design the mix. All the material delivered is batched and all the bins are fitted with batchers. Cement is added from a separate bin and batcher at one side.

Temporary washing and screening plant operated by the Imperial Rock Co. on California highway job

Batching plant for highway concrete—bin in foreground is for cement storage; Imperial Rock Co. operator



Diesel-powered shovel for bank excavation

Motor truck transportation from bank to plant hopper

Gas-Engine Electric Power

Power comes from two Climax gas engines, using natural gas as fuel, one 100-hp. and one 75-hp., direct-connected to electric generators and all the machinery is driven by electric motors. This is interesting because an electric power line runs almost over the plant. But purchasing power was altogether too expensive for a plant of this kind as the cost of the transformers would have had to be absorbed.

Water for washing is obtained from a well on the ground and is settled for re-use in a pond.

The success of a plant of this kind lies in producing what the highway engineer requires. If his specifications call for several sizes, each held within well defined limits, such a plant would not do. Such careful preparation of materials is necessary where everything in connection with the mix is specified and nothing is left to the discretion and knowledge of the engineer in immediate charge of the work. But the engineers of the California Highway Division have devised methods of design which adapt themselves sufficiently to variations in the deposit so that the concrete will always be of uniform strength and quality. This method seems to be, to the writer, an essential part of this story.

Adapting the Material to the Job

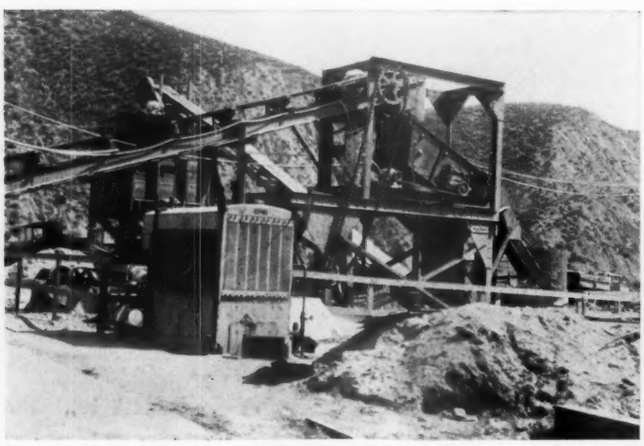
The method was explained by Stanley Hands, one of the engineers of the Division of Highways, who is well known to Rock Products readers because of his writings and his long connection with the rock products industry. It is a simplification of the method previously described in some of his articles.

All concrete for state work of this class must have six sacks of cement per cubic yard. The water-cement ratio is not directly specified but it is indirectly specified by the requirement for the total solid volume of the aggregate, which in this case is specified to be 20 cu. ft. As the solid volume of six sacks of cement is 2.82 cu. ft., this leaves 4.18 cu. ft. for the water in 27 cu. ft. of concrete, and this figures out at a water-cement ratio of 0.71.

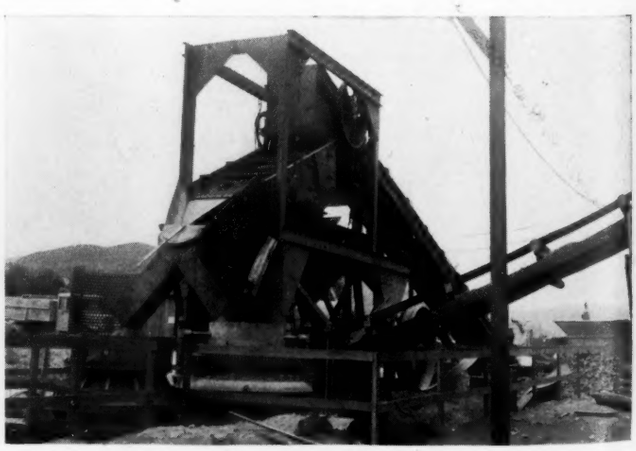
The state also specifies the grading of the combined aggregate by saying that the percentages of the various sizes shall fall between certain limits. These are given as maximum and minimum percentages in the table below and the percentage actually used on the day the plant was visited is given in the third column. It may be noted that it is almost exactly half-way between maximum and minimum in every size except the 2-in. and this is so near the top that it does not matter that it is the same as the maximum.

	Mesh	Maximum Pct.	Minimum Pct.	Used Pct.
Passing	200	1	0	0
Passing	80	5	0	1
Passing	40	8	3	5
Passing	30	12	5	8
Passing	20	18	10	13
Passing	10	27	18	20
Passing	3	40	30	34
Passing	½-in.	56	44	49
Passing	¾-in.	67	53	60
Passing	1-in.	73	60	66
Passing	1½-in.	84	72	82
Passing	2-in.	90	85	90

The proportioning is figured from the grading. For example, the above table



Details of crushing and screening plant



Other side of crushing and screening plant

shows that something between 5% and 12% must pass 30-mesh, say 8%. The sand to be used contains 24% passing 30-mesh. Hence the proportion to be used may be as 8 is to 24, or one-third. But examination may show that 8% of this gives more than the maximum of some other size, so instead of 8%, 7% or even 6% may be tried. Changes are made in this way until the plot of the grading will fall between lines representing the maximum and minimum percentages.

Batched by Weight

All proportioning or batching is by weight, and the required weight is readily found if the specific gravity of the material is known. So in designing a mix from new materials, about the first thing to be done is to determine their specific gravities. This is done by using a pincnometer, in the usual way. Supposing that the mix is to be one-third sand, as found from the grading, and that k, the total absolute volume of the aggregate, is 20 cu. ft., then the absolute volume of the sand will be one-third of 20, or 6.7 cu. ft. The required weight then will be 6.7 times the specific gravity of the sand times the weight of 1 cu. ft. of water (the same thing as 6.7 times the solid weight of 1 cu. ft. of the material of the sand grains). Supposing that the specific gravity was 2.6, this would figure to 1088.75 lb. All the components of the mix are calculated in this way.

Another useful figure is the ratio between the specific gravities. Suppose the sand has a specific gravity of 2.6 and the coarse aggregate a specific gravity of 2.8. The ratio is as 2.6 : 2.8, or 1 : 1.077. The use of this ratio is to keep the yield, and consequently the cement content constant. If the sand is thought to be in excess, and 100 lb. was to be removed for a trial mix, it is evident that this 100 lb. of sand would have to be replaced by 107.7 lb. of coarse aggregate in order to have the volume of the combined aggregates (and consequently the yield) the same.

Supposing that another trial shows that 3.98 cu. ft of water instead of the 4.18 first tried gives the right consistency, it will not do to increase the volume of k to 20.2 cu. ft. because the extra aggregate added will have its own water demand. So the increase must be calculated, if it is not to be found by a very tedious method of trial and error.

With 3.98 cu. ft. water and k equalling 20, the water aggregate ratio by absolute volume is 3.98/20 or 0.199. The new value of k will be such that k' plus 0.199 k plus 2.82 equals 27, or k' equals $(27 - 2.82)$ divided by 1.199, or 20.15.

The components of the concrete by absolute volumes then will be:

6 sacks cement.....	2.82 cu. ft.
Aggregate	20.15 cu. ft.
Water	4.03 cu. ft.

The cement content and the water-cement ratio have been maintained and the consistency has been corrected by adding 0.15 cu. ft. of the aggregate graded as before.

The water-demand curve of an aggregate is really a parabola but for small differences, as in this case, it may be considered to be a straight line.

Try to Use All Plant's Output

The amounts of material in the bins rise and fall with changes in the deposit. If it is found that one group of sizes tends to increase somewhat an effort is made to change the grading a little to use more of it, provided that this can be done without affecting the workability of the mix. The water, it must be remembered, is fixed. If this cannot be done the excess has to be wasted, but with the producer and the engineer in charge working to the same end, which is the production of *concrete of uniform quality* at the lowest cost, waste and friction are avoided. The concrete is being placed at $5.10 per cu. yd., and this includes all labor, material and overhead costs. It seems very low for 6-sack concrete, but there is said to be a profit in it for the concrete contractor and the aggregate producer, and the public gets the benefit.

Simple Way to Insure Uniform Moisture in Aggregates

A point that deserves especial notice is the control of the moisture in the aggregates. Of course the moisture must be reasonably constant or must be determined for every batch if the concrete is to be uniform in strength and consistency. There was a little trouble with varying moisture at the start but it was found that if the trucks were put in the dumping position, without the tail board being removed, and allowed to stand for 45 seconds the moisture content would be practically the same for every load. Of course the loads vary in wetness, but with an extra wet load so much more water runs out in this 45 seconds that the end point moisture is practically the same.

I was taken to the job to see how the concrete behaved by Mr. Templeton, the district engineer of the Highway Division. The paving is being laid in lanes and the job goes on like clock work, the daily stretches being from 1,700 to 1,800 ft. long. In the half-hour or so that I watched the concrete coming from the mixer the product was always uniform in consistency. Of course this uniformity has much to do with the success of the operation.

The Imperial Rock Corp. is not the only old-time producer that is going after the highway business with movable plants. The Granite Rock Co., one of the oldest crushed stone companies on the coast, I am told, has two movable plants with which it is crushing ledge out-croppings. The Atlas Rock Co., of Stockton, a well-known producer of dolomite and trap rock, is another. While I have heard of no others, no doubt there will be others soon, for the movement is founded on a solid economic basis.

General view of the Imperial Rock Co.'s temporary sand and gravel operation

Rules "Blasting Pins" Not Conclusive Evidence

REFUSING to accept the defendant's claim that the "pin" test is one universally and generally used to calculate and determine the vibratory force of blasting in quarry operations, the Appellate division of the New York Supreme Court has ruled that the test is not conclusive upon the question of damage by blasting to plaintiff's property; also that the defendant could maintain a buffer which would have the tendency to lessen the vibration caused by the explosion, and furthermore, that the discharge of more than 3000 lb. of explosives at one time is unreasonable use by the defendant of its premises, and constitutes a nuisance. The defendant, the New York Trap Rock Corp., was perpetually enjoined from using more than 3000 lb. of explosives at its Verplanck plant at one time.

Fluorspar in 1932

SHIPMENTS of 25,251 short tons of fluorspar in 1932, the smallest since 1901, reflect the low operations in the industries using it, an advance report of the Bureau of Mines states. Drastic reductions in selling prices of domestic material results also.

The reduction in shipments was 53% below 1931 and 77% below the average for the 5-year period, 1927-31. Imports were 36 less than in 1931 and 74% below the 5-year average, 1927-31. The average selling price by domestic producers to steel plants in 1932 was $2.03 a ton less than in 1931 and $3.89 a ton less than the average for the preceeding five years.

Commercial Value of the Lime Plant Laboratory

By Sidney P. Armsby
Houston, Texas

SINCE the lime producer's objective is the successful and profitable sale of lime products, it is certain that the net value of the service rendered by the plant laboratory may be gauged fairly accurately if we are able to measure, or evaluate, the different ways in which it facilitates sales; reduces production costs, or increases net profits.

Viewed in this light, the laboratory ceases to be a place of mystery and an activity of doubtful value. It loses its appearance of being merely an unavoidable and expensive evil imposed by the whims of the buying public, and becomes recognized for what it really is—an extremely valuable, necessary and utilitarian agency for the improvement of both products and markets.

What does it do to merit this high regard? It does many things, the accurate tabulation or evaluation of which is far beyond the scope of a single article such as this. I shall merely mention a few of the every-day activities of the up-to-date lime plant laboratory, and discuss briefly the relationships existing between such activities and the profitable production and sale of lime and limestone products. The list will be far from complete, and the reader will no doubt think of many other activities that should also be considered when attempting to establish the actual, commercial value of any particular lime plant laboratory.

Process Control

One of the primary functions of the lime plant laboratory is its routine control of manufacturing operations from day to day—which usually proceeds with such smoothness, and with so little comment, that the busy executive may easily under-estimate its real importance. Samples of raw materials and fuel are delivered to the laboratory at regular intervals; periodic sampling of quicklime, raw hydrate and finished hydrate furnishes more samples to be tested and filed away, and perhaps the flue gas from the kilns will be tested at certain hours each day—all without creating the least flutter of excitement for weeks at a time.

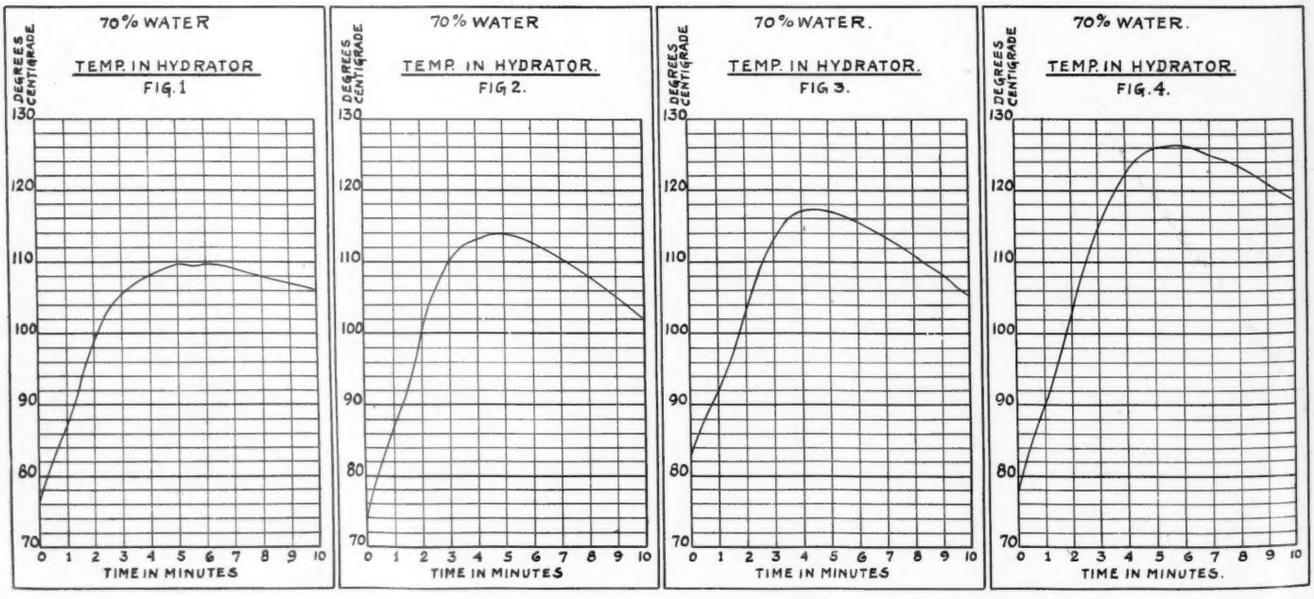
But let the superintendent complain about the appearance of the rock in a certain section of the quarry, or the burning characteristics of a new lot of fuel oil, or the falling off of the hourly output of the air separators, or the amount of lime being wasted in tailings—or any other of a number of things that affect the production efficiency of the plant; *or,* let some good customer complain about the quality of his last lot of lime! Then what about the importance of the laboratory?

Isn't it a "grand and glorious feeling" when, after a few simple analytical tests, your chemist is able to show that the solution of such problems is a simple matter, easily accomplished? The queer looking stone may be perfectly satisfactory as regards purity, and only require the proper "dilution" with stone from other sections of the quarry to prevent any bad effects when fed to the kiln. A test of the fuel oil may show it to be below the guaranteed standard of quality—so that it can be returned to the seller, or an adjustment made in the price paid for it. The output of the air separators may be stepped up by simply reducing the amount of water used in the hydrator, so as to decrease the percentage of free moisture in the raw hydrate. The wastage of lime in tailings may be reduced by more careful adjustment of burning or hydrating operations, or by some other detail easily susceptible to control by the laboratory. And the customer's complaint may be the result of his having accidentally received lime taken from the wrong bin, or perhaps it was caused by temporary and unavoidable conditions which resulted in the production of lime not quite up to standard. This can be explained and satisfactory financial adjustments can be made—with the result that the customer knows he is being treated fairly.

And how can the laboratory so readily solve such production problems? Solely because it has kept a constant check upon the various chemical and physical reactions involved in every step of the plant operations. Its detailed records of past performance furnish a complete tabulation of *just what takes place when satisfactory products are made from any given grade of raw material, handled under any given set of operating conditions.* With these standards of comparison at hand, it is an easy matter to identify either abnormal conditions or unusual results; the remedy usually is self-evident, and the laboratory amply justifies its existence and demonstrates its value to the organization.

Possibilities

And right here, let me repeat what I have often said before; namely, that chemical control of lime manufacture is still in its infancy, and that the future will see more important and valuable developments along this line than have been realized in the past. To illustrate just one of the possible future de-



Figs. 1-4. Time-temperature record of four successive batches in a lime hydrator

velopments, consider the question of the temperatures developed in a mechanical hydrator, of either the batch or continuous type, during normal operation. It is well known that, for any given grade of quicklime, the fineness, specific gravity, crystalline structure and plasticity of the raw hydrate are all affected by the amount of water used. And it is also known that, for each variation of these physical properties, there is an accompanying variation in the temperatures developed during the process of hydration.

When sufficient observations have been recorded, it is entirely possible that these various relationships may be tabulated or plotted in such a way as to afford an easy and accurate method for controlling the properties of finished hydrates by mechanical control of the temperature in the hydrator. The charts from a recording thermometer will then be coupled with other laboratory data to give a more complete history of hydrating operations than is obtainable under purely manual control.

The possibility of establishing such a temperature control, as a check on hydrator operation, is indicated by the plotted time-temperature curves shown in Figs. 1 to 4 inclusive. These graphs record the gradually rising temperatures developed inside a batch hydrator as the first four batches were run, when starting up the hydrator for the day. After batch number four was run, the operator found it necessary to increase the percentage of water since the hydrate was becoming too dry. With sufficient previously-recorded data at hand, the thermometer might just as easily have dictated the adjustment.

Research and Development Work

Research is another vitally important activity constantly being carried forward by the modern lime plant laboratory, and the financial returns derived from it may often be written in large figures on the credit side of the ledger. New problems are, of course, continually being presented, and the particular items under study at any one plant will depend upon operating conditions and potential markets. It is only necessary to mention a few typical research subjects in order to focus attention upon the many profit-making possibilities which may be developed by a well directed program of research work in your own laboratory.

(a) Conservation of Raw Materials. Perhaps your quarrying operations yield several different types of stone, a few of which do not calcine satisfactorily—due to some peculiar chemical or physical characteristics. A laboratory investigation of these peculiarities may reveal the possibility of making some special product from a selected grade of stone, handled by an original method or calcined in a novel manner. Or perhaps the various types of stone may be crushed to different sizes and blended in such a way as to eliminate irregularity in burning, with the resultant production of a more uniform product at a lower cost.

Or, an analysis of the gases leaving the kilns may show that an excessive amount of fuel is being used. In this case, a change in the method of burning or in some detail of kiln construction, or perhaps a different method of kiln operation—checked by laboratory tests of performance—may easily result in raising the burning efficiency and reducing the fuel bill.

(b) Development of New Products. The lime-consuming industries (particularly in the chemical field) offer many opportunities for the profitable development of new types or grades of lime to meet special requirements.

A certain refining operation may be adversely affected by the presence of even traces of free moisture, and the lime producer who furnishes a dependable moisture-free hydrate may reap a handsome bonus. Some customers in your territory may require a slow settling lime and others a quick settling product. Some particular industrial process may depend upon the rate of solubility of the lime used, while the efficiency of another process may be governed by the particle size or total surface area of the lime employed as a reagent. The elimination of a certain impurity from a given lime may greatly increase its value for some particular application. An increase in the percentage of water-soluble CaO may mean the difference between a poor market and a good one. Or, perhaps the production of a hydrate of high plasticity may open up an entirely new sales outlet.

All these and many other possibilities can be developed only by continued and painstaking investigation of the chemical and physical reactions involved in the production of lime from various raw materials and by different methods. And, if you are to profit by the results of such research, where can it be conducted to better advantage than right in your own laboratory?

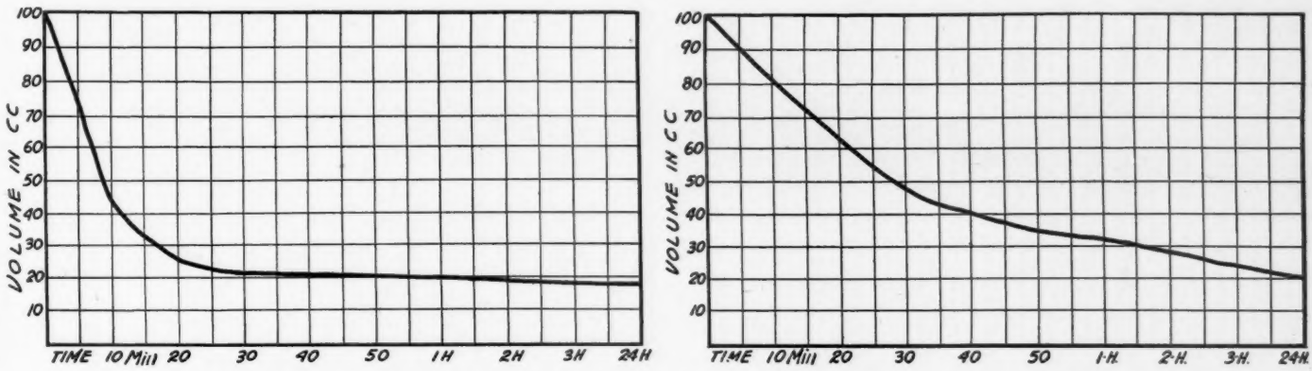
(c) Development of By-products. In many plants there are undeveloped possibilities for the processing of waste materials and the production of profitable by-products—the desirable developments being determined, of course, by joint consideration of both utility and potential markets.

Perhaps quarry waste, or oyster shell screenings, can be advantageously blended with a certain percentage of good hydrate so as to produce a high-quality agricultural liming material that can be sold at a price that will more than off-set the cost of handling what would otherwise be a troublesome accumulation of waste material. Or, the proper combination of various waste materials with the sand or clay of quarry overburden may yield a mixture of such a chemical composition that it would be attractive as a raw material for some nearby cement plant. Again, some step in your operations may yield a material that could be advantageously worked up into a trade-marked brand of whiting.

Then, of course, there is always the question of recovering both the waste heat and the carbon dioxide from the kilns. The possibilities here are so well known as to need no discussion in this article, and I think it is generally conceded that it is only a matter of time till carbon dioxide (either solid or liquid) will become one of the regularly marketed products of the modern lime plant.

Obviously, such developments as those just mentioned will be speeded up, and made more profitable, if the lime industry participates by means of systematic laboratory research covering the various problems involved.

(d) Development of Allied Products. By this I mean the production and sale of certain "specialties" which may result from the investigation of local problems, or may be induced by some special market demand in a given territory.



Figs. 5 and 6. Showing difference in settling properties of two quick limes, almost identical in composition

One lime plant laboratory has developed a new type of heat-resistant paint for the protection of kilns, stacks, boilers and other steel structures. Another has successfully fabricated and marketed a unique type of asphalt paving material, which employs a plant by-product as one of its ingredients. Agricultural sprays and poisons; masonry cement; prepared dry kalsomine, whitewash and other pigments; mixed fertilizers, and many similar products may be developed right in your own laboratory, and may be the means of increasing both your sales volume and your operating efficiency.

(e) New Processes and Patents. While it is true that a large majority of the industrial applications of lime have been developed and perfected by those who use the lime, this does not mean that lime producers are prohibited from discovering new outlets for their products. Nor is there any reason why more efficient methods for handling, processing and utilizing lime should not be devised by those who are most interested in securing its larger industrial consumption.

If your laboratory develops a new type of lime product, or some allied specialty, the process can often be advantageously patented. Similarly, some peculiar physical property of one particular lime product may allow it to be more efficiently handled or processed by the customer in a new or novel manner which can be made the basis for valuable patent claims. Or, perhaps a certain grade of lime—because of its exclusive chemical and physical properties—may be made to replace some costlier chemical reagent used in a certain refining process, or other manufacturing operation. Laboratory studies of the process to be served and of the inherent properties of the lime may result in a substantial saving to the customer and in valuable chemical and mechanical patents for the lime producer—to say nothing of an enlarged market for lime.

Several such developments have already resulted from the research work done in lime plant laboratories, and there is no doubt that others will be forthcoming in the future.

Technical Service to Customers

One of the surest methods of securing a desirable customer, and of keeping him satisfied, is to show him that your interest in him goes beyond the point of merely wanting to sell him some lime. Convince him that you want him to get the highest possible efficiency out of the lime he uses, and that you are capable of intelligent cooperation to this end, and you will secure a good friend as well as a desirable customer.

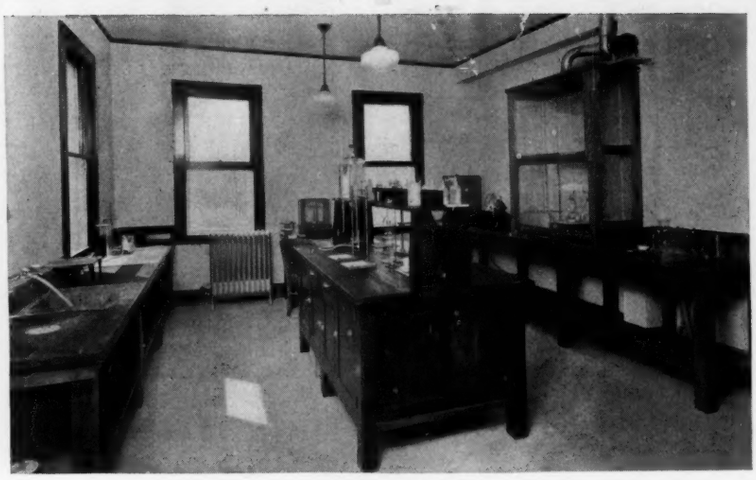
Your laboratory can cooperate with the customer by studying his operations in order to find out both how and why he uses lime. Perhaps a timely suggestion may be given, that will result in the lime being handled in a more efficient manner. Or perhaps the customer has been using the wrong grade of lime for certain applications. Or he may be able to make some slight change in his process whereby lime can be made to serve in a capacity previously unknown to him. He will welcome any constructive suggestion that results in greater efficiency, and your knowledge of the proper utilization of the lime you produce may help him to solve a difficult problem, or to determine his own lime requirements more accurately.

By helping him to use lime more effectively you gain both a new market and a new friend, and you also assist in securing for lime the recognition it deserves as a high-grade industrial chemical reagent.

Planning Advertising Campaigns

The subject of planned, technical advertising will be discussed in another article, but I wish to call attention here to the fact that every industrial application of lime is based upon one or more of its chemical and physical properties. No matter whether it is petroleum refining; water purification; plastering; mortar work; cotton dusting; soil improvement, or egg preserving, the consumer is using lime because it will or will not do certain things, or because it reacts in a definite manner under specified conditions.

The more you know about the chemical and physical reactions of which your lime is capable, the more intelligently and profitably you can advertise it and promote its sale. Where can you secure fundamental technical data, specially adapted to your advertising needs, more advantageously or economically than from your own laboratory?



A modern lime plant laboratory

Using Paint as Light

THE VALUE of paint as a factor in producing satisfactory lighting conditions is discussed in a publication recently issued by the New Jersey Zinc Co., New York, N. Y. The effect on strength of light in different locations of rooms having walls of certain colors is shown in charts. In certain plant operations efficiency of labor is definitely affected by lighting conditions, and rock products plants having such conditions might find the book of value. It is prepared to enable plant superintendents to determine a solution of lighting problems.

Look for Small Orders!

THE advertisement below is an example of what can be done to drum up local trade—once of small moment to producers, but just now perhaps the best market available. The advertisement shown appeared in small, weekly county newspapers. The plant is a trucking operation exclusively, located near the center of Du Page County, Illinois.

SPRING IS HERE

AND SO ARE

Bargain Prices in Materials

For 15 days we are offering Gravel, Sand and other materials at give away prices so that you may have an opportunity to get acquainted with us.

We have thousands of tons of clean pea gravel, excellent for dressing drives, walks and lanes. We also have a big supply of boulders for rock gardens, etc., at prices we think have never been and will not ever be equalled.

For a limited time the following delivered prices will be in effect:

	PER TON
Clear Washed Pea Gravel	$.60
Clean Torpedo Sand	.60
Crushed Road Gravel	.85
Washed Gravel	.85
Large Clean Boulders	.95

The above prices are for 5 tons or more per load, cash on delivery to Wheaton, West Chicago, Winfield.

For Glen Ellyn, Lombard, Naperville, add .20; Elmhurst, add .35; Hinsdale, add .50.

Patronize DuPage County Labor and Material. All the above is produced in DuPage County.

DuPage Sand & Gravel Co.

PHONE WHEATON 2100

Judging by gravel garden walks appearing with the new spring, some material is moving. A market which seems capable of considerable development, in this part of the country anyhow, is alley surfacing. There are few paved alleys outside of Chicago, and a live-wire producer by contracting both for the material and the spreading of it could do quite a little business, apparently.

Price, Profit and Prosperity

Rock Products Producers Must Hold to Necessary Fair Price Increases Regardless of Unintelligent Opposition

IN a discussion of "Price Trends," ROCK PRODUCTS' Annual Review Issue, December 31, 1932, it was stated: "If price increases are made under present and immediately prospective conditions, of slack demand in the face of large over-capacity of the industries, it requires that practically every producer admit that a price increase is his only salvation; that he refuse to take business on which he can not turn a profit. * * * * * Obviously these decisions all take moral courage and a broad-gage attitude toward business recovery. However, it would seem that they present the only sound course for this or any industry to pursue. The alternative is wholesale receiverships and bankruptcies, with no ultimate benefit to the survivors so long as the plants of their erstwhile competitors continue to exist, to be operated again, in all probability, with a return to profitable prices."

The portland cement industry is apparently the first to give unanimous acceptance to this obvious truth. Since the first of the year there has been a marked stiffening in prices quoted for portland cement. It is also reported that this has stimulated a stiffening of the back bones of producers of other rock product construction materials, and there are reports of better prices for crushed stone, gravel and sand in many localities. Obviously, the portland cement industry can not alone fight the battle against continued *deflation.* With every agency of the Federal Government, including the Supreme Court, working to check further ruinous deflation, the continued selling of commodities below cost of production is indefensible and evidence chiefly of the incapacity of those business executives who persist in it.

Lower Wages, Costs; or Higher Prices

As every producer knows, selling below cost can have but one of two outcomes: (1) bankruptcy or (2) further reduction of costs by lowering wages, salaries and cutting out of all capital expenditures for needed replacements and modernization. The second alternative is far-reaching in results because lower salaries and wages mean decreased purchasing power of employes, and consequently ultimate curtailment of many industries making consumer goods; cutting out of needed capital investments means likewise the curtailment, or even suspension, of many machinery and equipment concerns, destruction of the purchasing power of their employes, and so on in spirals or circles of continuous deflation, or reduction of purchasing power, and consequently of the money values of everything. The Federal Government can not reverse this tendency by inflation of currency or in any other way. It can merely provide the encouragement or possibly the means for industry itself to halt further deflation.

Dealing With Organized Buyers

The rock products industry, in the Middle West at least, has to deal with powerful organizations of buyers—state highway departments, county and municipal governments. These organizations of buyers have the benefit of being able to obtain much publicity for their side of a controversy. The producer and seller has the disadvantage that the merits of his case are not given publicity and are often considered secondary to political expediency. Under such conditions appeal to public opinion is apparently the only recourse; and absolute adherence to established prices is the first step toward public sympathy or respect; for weakness can only be interpreted as a confession of guilt.

It is not impossible to convince the public of the justice of price increases, as witness the following first-page item in a Chicago daily newspaper of recent date:

Commissioner of Public Works Oscar Hewitt announced to the city council today that paving materials had increased 65 per cent in price and the democratic members of the council cheered.

"Cement was $1.28 a barrel last year," said Commissioner Hewitt. "This year it's $2.10 a barrel. I called the companies in and asked them why the identical bids. They told me they had lost money last year on the city business because they fought for it. They admitted they had got together.

"I wrote to various surrounding states as well as to Springfield to ask about prices on paving material. They told me prices were up all along the line. For instance, the prices to the state of Illinois have been increased about 96 per cent."

Alderman Nelson, who is a republican, asked:

"To what do you attribute this increase in prices?"

Said Mr. Hewitt:

"I think it is due to the efforts of President Roosevelt. There is a spirit of revival among all manufacturers due to his efforts and they are all raising their prices."

That brought a long and loud cheer from the democratic majority in the council.

The contract was approved for $186,000 worth of work and the men will be put on the streets shortly.

On the other hand, Chicago newspapers are giving much publicity hostile to manufacturers, on the increased prices asked for state highway materials in Illinois, Indiana, Iowa, Missouri and Wisconsin.

Cement Manufacturers Losing Money

There is talk of state investigations to determine the costs of cement manufacture. Such investigations are unnecessary; the financial statements of cement companies are evidence enough that the cement industry could not long exist on 1932 prices without more *deflation* of wages and salaries. From these reports (and they are usually intended to be as optimistic as possible) any one can readily determine what approximately it cost to make and sell cement in 1932. The Lehigh Portland Cement Co., for example, reports sales of $6,386,394.40 and costs of $7,431,975.92. The report states that 28% of the company's 25,000,000-bbl. capacity was utilized; that is, approximately 7,000,000 bbl. was sold. The average selling price was therefore about 91c per bbl. and the cost about $1.06 per bbl. The Alpha Portland Cement Co. reported sales of $3,857,756.62 and costs of $5,719,482.84. It operated at 32% of its 13,000,000-bbl. capacity, or sold approximately 4,160,000 bbl. The average selling price was 93c per bbl. and the average cost almost $1.38 per bbl.

These figures are not accurate, probably, but must be very nearly right. With average selling price around 90c and average costs around 100c, it is obvious the more cement a company sold in 1932, the bigger its deficit at the end of the year. The executives in the cement industry, in few instances, *own* their companies; hence they are held accountable and responsible for these losses—in both these companies stock is extensively held by *the public.*

No Advantage to the Small Producer

Much has been written by people not thoroughly familiar with industry of the advantages today of the *small* producer over the large one—ability to adjust his costs and consequently his prices downward, etc. The fact is, as every producer in every industry knows, that the average small producer is the greatest menace to stability and recovery. If to be ignorant of real costs and irresponsible are advantageous, the small producer often does have the advantage. He may have the moral right to ruin a business because it is entirely his own, and because there is no public directly interested to intervene; but his moral right to ruin an industry of which he is a part does not follow; and public opinion (even as interpreted by the courts) is calling into question his legal right.

There can be no business recovery in this country until both little and big producers realize that a margin between cost and selling price is the keystone of our whole system of economy. Without such a margin there can be no accumulation of capital for investment in new enterprize, in new construction,

public or private, no source of income to the Federal Government, no buying power for owners or stock holders, and only the minimum in wages and salaries for employes. Instead of rebelling against prices merely and necessarily made to continue and expand industrial activity and employment, public officials, whether republicans or democrats, with comprehension of the economic problem faced by the country, should be outstanding advocates of a business policy so obviously in the public interest.

TAXPAYERS Want No Public-Operated Plants

ONE of the meanest weapons used by organized purchasers, like state highway departments, against producers of cement and other rock products is the threat to put the state or the public into the cement, or crushed stone, or sand and gravel business, if prices can not be forced down to a level that these purchasers, without any consideration of the merits of the case, deem low enough.

With school teachers, policemen, firemen and many other public employes unpaid, and with state and municipal finances in the mess they are, nearly everywhere, **TAXPAYERS** certainly are in no mood to allow public servants to demonstrate further their business incapacity in new ways. Wherever such irrational agitation is raised we suggest producers get busy with newspaper editors and the public and put some facts before them.

Here are some facts that should help:

What Los Angeles TAXPAYERS Paid

The city of Los Angeles built a cement plant at Monolith, Calif., designed for 1200 bbl. a day at a cost of $890,000. Manufacture was begun March, 1909, discontinued March, 1913; 899,844 bbl. were produced.

It had been contended that the city could manufacture cement for $1.02 per bbl., including maintenance charges and interest. The lowest bid received from private companies was $1.32½, at mill, or $1.70 delivered at the shipping point for the job. The freight rate from the municipal plant was 19c. Advocates of municipal ownership claimed the city would save about 50c. per bbl.

An audit made in April, 1915, for the Merchants and Manufacturers Association of Los Angeles by Price, Waterhouse & Co., showed that the cost per barrel, exclusive of interest and depreciation, had been $1.84. At that time the city hoped to sell the plant for $550,000. Depreciation included, the cost per barrel was $2.22. Simple interest on $890,000, the construction cost, at 5% up to that date amounted to 30c. per bbl. on all cement made, a total cost of $2.52 per bbl. This experiment cost taxpayers at least 82c. per bbl.

The cost to **TAXPAYERS** did not stop there. In 1915 the city leased the plant to the county, which operated it until January 31, 1917. Then the plant was closed and remained idle until sold for $450,000 in 1921. Interest and depreciation charges, paid by **TAXPAYERS**, continued until final estimates of the cost of cement used in the Los Angeles viaduct reached $2.93 per bbl. or $1.23 more than the price for which the city could have purchased cement from private companies.

How Michigan TAXPAYERS Fared

On June 6, 1931, the governor of Michigan signed a bill providing for the sale of the Michigan Prison cement plant before June 30, 1934. If not sold by that date "it shall be dismantled and the salvage forthwith sold."

This virtually brought to an end a seven-year experiment in state operation, costly to **TAXPAYERS** and subject of continuous and bitter political controversy.

The plant, at Chelsea, was leased by the Prison Commission from the Michigan Portland Cement Co., December 1, 1923, at an annual rental of $75,000 with option to purchase for $500,000. The agreement provided that if this option were exercised before December 1, 1926, all rentals previously paid should be applied on the purchase price. In December, 1925, the state purchased the plant on the basis specified. Funds for the purchase together with working capital were advanced from the state industrial fund, with no interest charge made.

On January 1, 1931, Ernst and Ernst, accountants and auditors, submitted a report of their examination of the plant to the state administration. Not taking into account certain chargeable expenditures, it showed a total loss of $160,000 for the period from June 30, 1928, to December 20, 1930. The average loss per bbl. for the period was 9c.

Nothing was charged here for sales costs or taxes, nor for feeding and clothing 200 or more prisoners employed. Because the product was sold through various state departments, selling expenses were small.

A considerable amount of money was spent for barracks, guard houses, fences and other necessities. Guards also were employed.

These items were not charged to the cement plant. The investment in the buildings probably will be almost a total loss as little use has been found for them since the cement plant closed. **TAXPAYERS** have footed the bill for these expenditures.

The Michigan plant has not been sold. The cost to **TAXPAYERS** in depreciation and interest charges continues.

How South Dakota TAXPAYERS Pay

South Dakota went into the cement business during the height of the Non-Partisan League movement in 1917. The state legislature authorized the submission to the voters of an amendment to the constitution to permit establishment of a state-owned plant. This amendment was carried in 1918. The 1919 legislature created a cement commission to report on plans. A bond issue of $1,000,000 was authorized on representations by proponents of the project.

This commission filed a report in which the following appeared:

> That with the sale of part of the bonds the commission will proceed to pay for the site and prepare plans for a new, well-equipped cement plant in which the commission is convinced they can manufacture a cement which will be equal to the best, at a maximum price of $1.36 per bbl., on the basis of the August, 1920, prices. But that they cannot complete an efficient, economical plant from the proceeds of $1,000,000 of bonds already authorized.
>
> That with equally efficient management, the state would be able to manufacture cement about 100% cheaper than private companies. The state would have no local or income taxes to pay and the sales expense would be very low because they sell largely to the state highway department and counties.

A second cement commission was appointed in January, 1921, and another $1,000,000 was appropriated. The capacity of the plant built at Rapid City is 2,000 bbl. a day.

A committee of the state legislature in 1925 found that the cement commission had received from bond sales and general appropriations a total of $2,095,933, that expenditures amounted to $2,040,078. The committee said:

> Your committee is unanimously of the opinion that the plant, together with sites and equipment, should have been constructed at an expense of not to exceed $1,500,000 and we feel that the money spent in excess of that for construction and land has been negligently spent and wasted.

The commission recommended the appropriation of an additional $275,000 for operation. This sum was authorized and the plant began to operate.

Marketing methods and sales policies have conformed to the practices of privately owned companies. Cement is sold through dealers and the form of contract

is substantially the same as that used by private companies.

In general, the product of the state plant is sold at the market price, so that the promise of cheaper cement to the consumer has not been fulfilled.

The statement for the period ending December 30, 1930, issued by the South Dakota Cement Commission, claims a profit for the year of $212,064.29. The total profits from January 1, 1925, to January 1, 1931, are $790,188.42, according to the commission.

Qualified and experienced accountants assert that under approved bookkeeping methods, this alleged profit would resolve itself into a loss of $377,426.55.

Charges not included were interest on bonds, proper depreciation and the loss to the state of taxes—all fundamental elements in determining the financial status of a going concern, whether its ownership be private or public. The depreciation should be calculated on the basis of 5% annually against depreciated fixed assets. This method of calculation has been approved for the cement industry by the U. S. Treasury Department.

The record does not bear out the prophecies of the first commission. Included in the findings of this commission —which undoubtedly had weight with the voters—the following is found:

> That with the prospective demand and use of cement in South Dakota within the next five years we are of the opinion that a cement plant located at Rapid City would save twice the cost of building the plant.

"Twice the cost of the plant" would be upward of $4,000,000 profit. Instead there is a loss of $377,426.55.

TAXPAYERS each year are paying $102,700 interest on the $2,000,000 of bonds, which was not taken into consideration in the state commission's report. **TAXPAYERS** also are making up a loss to the state an average of more than $35,000 annual taxes, which a similar plant would pay were it owned by a private company.

Nevada Silica Deposits to Be Operated Soon

A LARGE DEPOSIT of silica sand has recently been taken over by a group of men headed by Charles Born of Van Nuys, Calif. The property comprises more than 800 acres and is located near Overton, Nev.

Tests of samples from the deposit show it to have high purity. It is claimed to be suitable for the manufacture of first quality flint glass. Market for a good quantity of this material on the Pacific coast has already been found, it is reported, and a much larger potential market is in prospect and it is the intention of the new company to develop the deposit on a large scale in the near future.

Pacific Coast Aggregates Gets Big Contract

UNDER the supervision of Chief Engineer Joseph B. Strauss contracts have been let for the substructure of the Golden Gate Bridge, San Francisco, Calif. The Pacific Bridge Co., San Francisco, was awarded the contract for the two main piers, the southern of which will be provided with a concrete fender; Barrett and Hilp, also of San Francisco, received the contract for the two anchorages, necessary pylons, the pedestal footings for approach viaducts and for the two abutments. The two contractors immediately sub-let the cement and aggregates contracts to Pacific Coast Aggregates, Inc., of San Francsico, and this organization, in turn, entered into contracts for cement and mixing with its subsidiary, Golden Gate-Atlas Materials Co.

The aggregates specifications on which bids were offered were as follows:

Coarse Aggregate.

Coarse aggregate shall consist of clean, hard, strong, durable gravel or crushed natural stone, free from injurious amounts of soft, friable, thin, elongated or laminated pieces, alkali, loam, coal, organic or other deleterious matter. It shall range in size from fine to coarse within the following limits:

Passing 2-in. sieve	Not less than 95%
Passing ¾-in. sieve	Not less than 40% Not more than 75%
Passing No. 4 sieve	Not more than 10%

The Engineer may require the use of aggregate between two inches and eight inches in size, graded to the satisfaction of the Engineer.

Fine Aggregate.

Fine aggregates shall consist of sand having strong, clean, hard, siliceous particles; shall be free from clay, silt, loam, coal, shale, salt, soft or flaky particles, twigs, leaves, roots, or other organic matter. The sand shall range in size from fine to coarse, within the following limits:

Passing through No. 4 sieve	Not less than 85%
Passing through No. 50 sieve	Not more than 30% Not less than 10%
Weight removed by decantation	Not more than 3%

The usual tests in accordance with standards of the American Society for Testing Materials are specified.

Contracts already let call for upwards of 300,000 cu. yd. of concrete; to deliver the required materials expeditiously and economically the aggregates corporation proceeded first to arrange a set-up that includes pretty well all the production sources of the immediate vicinity of the job. Railroad transportation to the bridge-head sites, both on the San Francisco and on the Marin shores, does not exist, therefore it became necessary to handle all materials by barge. An elaborate system has been devised and docks built at both bridge-head sites for receiving the enormous tonnage of aggregates and cement required.

Will Help Competitors

Aggregates will come from plants, quarries and pits within a radius of 45 miles. To ensure an entirely dependable supply, and also to spread the benefits of this enormous contract as widely as possible—a gesture called for by the times!—Pacific Coast Aggregates divided up the material bills and will buy from competitors and small producers, as well as using their own sources.

Its large yards in Oakland provided a point of loading for all aggregates that have to come from the east-bay side, and there a tipple is being built to handle loading to the barges. This plant is geared to a capacity of 600 tons of material an hour and can be operated, when necessary, day and night. A fleet of 400-ton barges will move the materials directly to either dock on the bridge site; they will be unloaded there by locomotive cranes into 1500-ton capacity bunkers and the aggregates will be taken thence by conveyor belts to the batching plants.

For the first time on a far western job cement will be handled in bulk for these structures. The engineering staff of the Aggregates Corporation designed the barges, which are capable of transporting 2100 bbl. (400 tons) each. At the bridge-head sites Fuller-Kinyon cement pumps will drive the material to the dock storage and from that point screw conveyors will take it to the batching plants. It is provided that cement can be delivered to the job at the rate of 200 bbl. per hour at each end, which is considerably over estimated maximum requirements.

The Redwood City plant of the Pacific Portland Cement Co., located on tidewater south of San Francisco and Oakland, is to furnish the cement for the jobs. It has a large capacity and is already at work on the contract. It is interesting to note that the raw material at this plant is of a shell origin. With ample docking facilities, including channels deep enough to accommodate ocean-going cargo-boats, the Redwood City mill will be able to handle its end very economically and to furnish required material as fast as it is needed.

Cement Production Gains Over Pig Iron

CEMENT AND IRON production from 1875 to 1932, inclusive, are compared in an article by Edwin C. Eckel, consulting geologist, Washington, D. C., in the March issue of the *Manufacturers' Record*. He shows that the cement industry has grown more steadily than the iron industry in recent decades; that its gains during booms have not been so spectacular, but on the other hand it has lost less of these gains, during the succeeding depressions. He thinks 1933 will see slowly increasing outputs of both cement and iron; he also thinks "that until and unless our public transportation problems are settled in an unexpectedly favorable fashion, we will see more cement made and used annually than iron, in this country, at least." His figures show 41 million tons of pig iron to 28 million tons of cement in 1929, but in 1932, only 8,750,000 tons of iron and 13,000,000 tons of cement.

New Barge Loader Solves Small Plant Problem

By Edward J. Tournier
Clifton, N. J.

EQUIPMENT for loading barges is usually more expensive than other kinds of materials handling machinery. A very satisfactory and inexpensive installation has been made, which not only loads barges, but also provides means for ground storage.

The West Nyack Trap Rock Co., at West Nyack, N. Y., ships stone north to Albany, and south to New York City, by barges on the Hudson River. The stone is hauled by motor truck to the water-front for transfer to the barges. At this point a novel design of loading station fills the barges and places the excess in storage. A diagrammatic arrangement of the plant is given in Fig. 1, on which the various units are marked by letters for identification. Fig. 1 also shows the general construction of the conveyors.

Trucks are driven up a short ramp, terminating at a reinforced-concrete unloading hopper. Below the hopper a belt feeder draws out the material uniformly at the rate of 150 tons per hour, and places it on a belt conveyor extending back into the pit. This conveyor is inclined so as to elevate at the same time that it conveys the stone to the top of a loading tower at the edge of the pier, approximately 93 ft. from the center line of the unloading hopper. At its upper end the conveyor delivers to a perforated plate over which water sprays are arranged to wash the dust from the stone, which must pass State inspection. The wash-plate is fitted with a drain-pan, and a chute at its lower end discharges the clean stone to the loading end of a short boom conveyor. This in turn delivers into a turntable chute which loads the barges evenly. In addition, the boom conveyor with its chute can be swung through an arc, to either side of the tower, for use in forming ground storage.

Conveyor Equipment

The belt feeder, No. 1, is 30 in. wide, 5 ft. 3 in. c. to c. of head and tail pulleys. It is made up of 5-ply Everwear belt with $\frac{1}{16}$-in. rubber top cover, carried on through type feeder idlers, which are equipped with Timken roller bearings. Head and tail pulleys are of cast iron, designed for conveyor service. The 12-in. diameter head pulley receives power through a chain and sprocket transmission, from the tail pulley of conveyor No. 2, which gives the feeder belt a speed of 37.5 ft. per min. At this speed stone is fed to conveyor No. 2 at the rate of 150 tons per hour.

Owing to the fact that the tail pulley of conveyor No. 2, which supplies power to the feeder, is also a takeup outfit, a special compensating device is provided in the chain drive to keep it at proper tension and length.

A steel chute transfers the stone from the feeder to the tail of belt conveyor No. 2. This is 20 in. wide, 79 ft. 6 in. c. to c. of head and tail shafts, and is inclined 19 deg. from the horizontal. The belt is Durabelt of stepped-ply construction, with 6-ply edges, 4-ply center, $\frac{3}{16}$-in. top rubber, and $\frac{3}{64}$-in. bottom rubber cover, made of 28-oz. duck.

The troughing idlers are 3-pulley type, equipped with Timken roller bearings, mounted on wood boards, and spaced 4 ft. 6 in. centers. The return idlers are of steel tube construction, equipped with Shafer roller bearings, and are spaced 10 ft. centers. All idlers are equipped with Alemite lubrication. The selection of anti-friction idlers in this case was not so much because of power savings, but to reduce to the minimum the expense of attendance for lubrication and

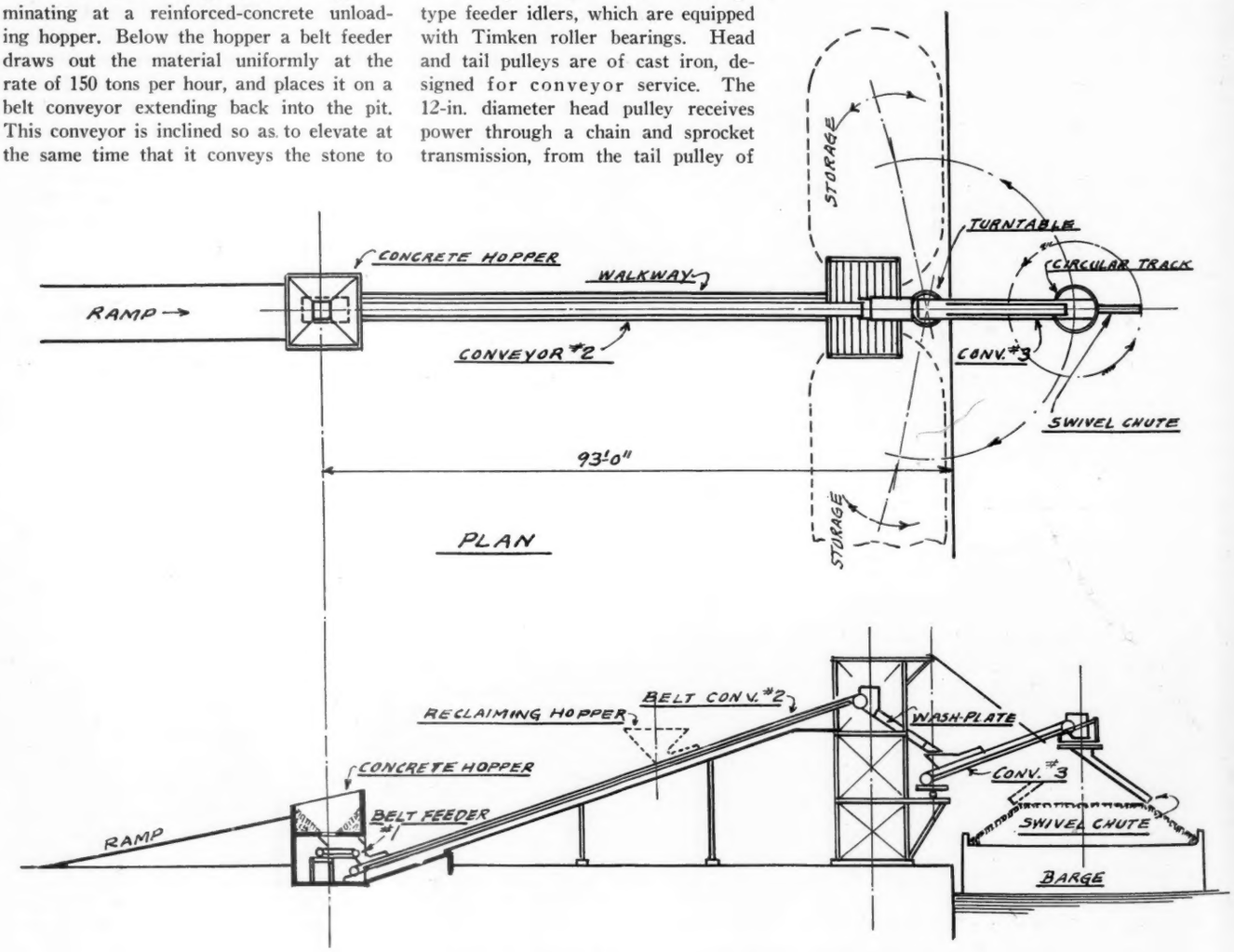


Fig. 1. General arrangement diagram of conveyors and loading chute

other maintenance required with plain bearing equipment.

The drive pulley of conveyor No. 2 is 24 in. in diameter, and of the same design as the feeder pulleys. Power is supplied to the head shaft through two cut, spur-gear transmissions, from a 10-hp., 900-r.p.m. Continental motor, wound for alternating current, 220-v., 3-phase, 60 cycles. With this motor and transmission, the belt operates at 325 ft. per minute, and requires 7 hp. when working at the rated capacity.

Stone discharged from conveyor No. 2, and having passed over the wash-plate, is received by conveyor No. 3. This is also 20 in. wide, with the same type of idlers and belt used on conveyor No. 2, but is only 21 ft. 6 in. long. Head and tail pulleys are respectively 20 in. and 16 in. in diameter, of cast iron, similar in design to those on the other conveyors. The belt runs 360 ft. per min., and receives power from a 5-hp. Continental motor, the net power requirement being 3 hp. at the rated conveyor capacity.

Conveyor No. 3 is mounted on a timber frame having its lower end supported on two cast-iron rollers, and its upper end suspended by inclined tension rods, from the loading tower structure. The turntable at the lower end is fitted with a king-pin, which centers it on a steel plate serving as a track for the wheels. The upper suspension is hung from a swivel on the tower, which, in combination with the turntable, allows the boom to swing through an arc slightly in excess of 180 deg.; the boom is not movable in the vertical plan.

An Unusual Chute Design

The distributing chute at the head of conveyor No. 3 is a design resulting from the necessity of loading stone in an even pile on the barge, at the least possible cost. There are many methods in use for loading barges, but most of them require expensive equipment for handling spouts and other fittings. The device described here, is both inexpensive and functions in every way as it was expected to do.

A small fixed chute at the head of conveyor No. 3 directs the stream of stone into the top of the swivel chute. This spout which is about 14 ft. long, extends at an angle of about 38 deg., to a point 10 ft. beyond the center of rotation. The end turns in a circle 20 ft. in diameter, through manual operation. The rotation of this chute, combined with the circular movement of the boom from which it hangs, permits distribution of stone over a large area, without moving the barge.

The novelty of design in this swivel chute, is in the fact that it requires no overhead hanger, and thus is free to revolve 360 deg. It is centered by four cast-iron, flanged wheels, running on a track 30 in. in diameter, and is supported by three flat-faced rollers on a circular track 7 ft. in diameter. Two of the rollers are at the front, where the weight of the chute causes a heavy downward pull, and they run on the top of the 7-ft. track. The third roller is at the back, where an upward thrust occurs, and it runs on the bottom of the 7-ft. track.

Ground Storage

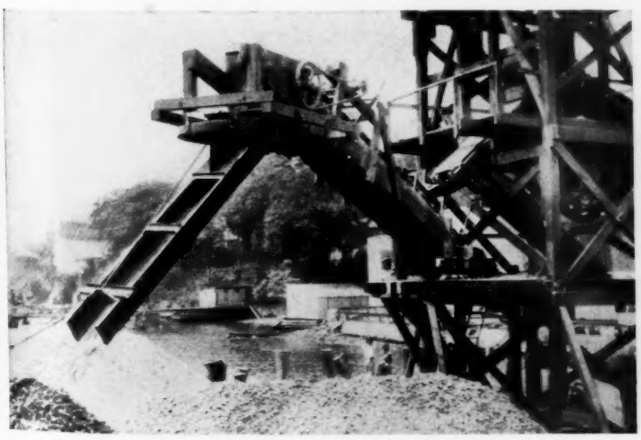
In order to guard against possible failure of deliveries from the quarry, it is planned to have an emergency ground storage at the loading tower. This is formed initially by swinging the boom conveyor to either side of the tower, and by means of the swivel chute, to form conical piles. If necessary, these may be increased in capacity by spreading with a crane, which would also be used for reclaiming. In this case a hopper placed at a suitable location on conveyor No. 2, as indicated in Fig. 1, would discharge stone to the belt. From this point the process would be the same as for material coming direct from the concrete hopper.

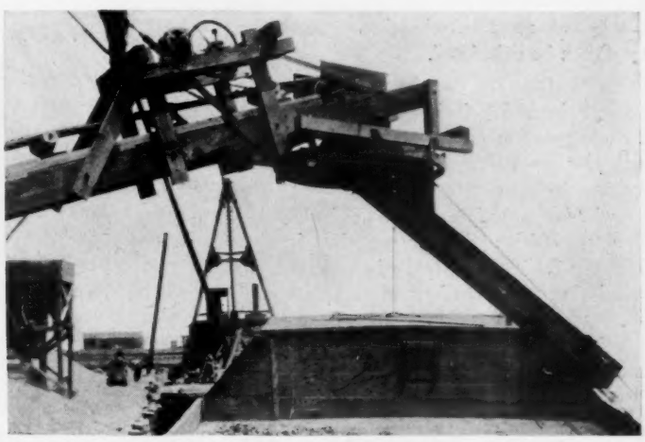
Construction Work

All of the structures except the concrete pit and incidental iron work, are of timber furnished by the West Nyack Trap Rock Co. The supporting frame for conveyor No. 2 is of open construction, with a walkway on one side only, for access to the machinery. The tower is also of open construction, with provision made for later covering with wood siding.

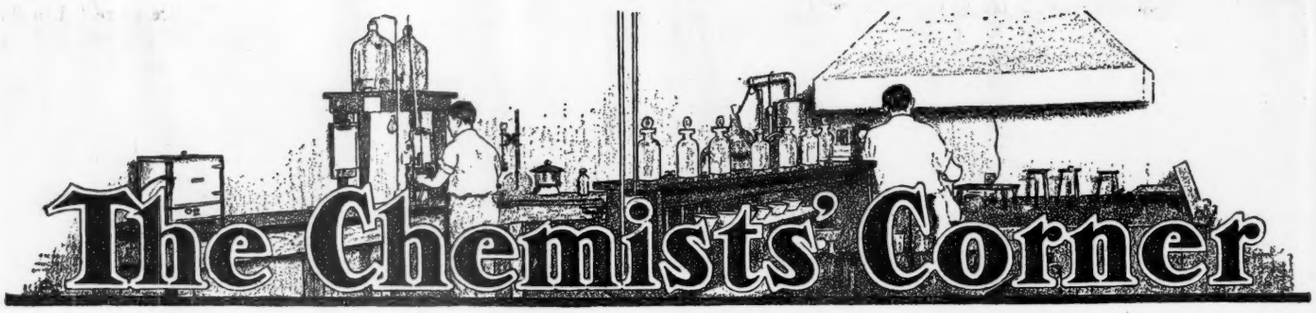
The Robins Conveying Belt Co. designed the installation and supplied the conveying equipment; electric motors were furnished by the Continental Electric Co. All of the construction work was done by the West Nyack Trap Rock Co., by day labor.

Fig. 2. View along inclined conveyor No. 2, showing also, in center, the boom conveyor and chute





Figs. 3-4. Discharge end of boom conveyor, with swivel chute and turntable



The Recast Analysis and Its Relation to the Chemistry of Portland Cement*

Part X—Computation of Portland Cement Raw Mixtures (Continued)

By Louis A. Dahl

Research Chemist, California Portland Cement Co., Colton, Calif.

WHEN MIXTURES are calculated to obtain pre-determined values for two or more components, the equations are set up in the same manner as in the previous computations, but the number of equations and the number of terms in the equations is increased. The number of equations is always one greater than the number of components to be controlled. The equations are easily formulated, but the solution of the equations is more difficult, and the results are subject to considerable error due to dropping decimals. If it is intended, for instance, to calculate the fractional proportions of the materials to four decimal places, it is necessary in the common direct method to carry large figures throughout the solution of the equations, even to the extent of retaining six or seven decimal places in the successive steps in the solution. The additional figures increase with the number of components to be controlled, since there are more steps in the solution and consequently more instances in which figures must be dropped. A better method is to solve the equations without attempting to obtain a solution as accurate as may be desired, the solution to be regarded merely as an approximation. Corrections may then be calculated.

To illustrate the complete method, and the manner in which it is possible to simplify the computation of corrections, it is necessary for us to present the solution of a specific problem in detail. For this purpose we will use materials *A*, *B* and *C* (Fig. 17). The composition of these materials is given in Table 7. The problem will consist in the calculation of proportions of these materials to obtain a mixture in which the potential C_3S is *a*, and the potential C_2S is *b*. The fractional proportions of *A*, *B* and *C*, to be determined, are *x*, *y* and *z* respectively. In order to make each step in the solution clear, each equation will be designated by a letter, followed when necessary by an expression in parentheses indicating the source of the equation.

TABLE 7. COMPOSITION OF MATERIALS *A*, *B* AND *C*

	Material		
	A	*B*	*C*
Oxide composition			
CaO	90.00	5.00	10.00
Al_2O_3	5.00	20.00	30.00
SiO_2	5.00	75.00	60.00
Potential composition			
C_3S	294.80	—684.08	—616.89
C_2S	—208.05	731.08	637.39
C_3A	13.25	53.00	79.50

The equations representing the conditions of the problem are formed in the same manner as in previous problems.

$$(A)\quad 294.80x - 684.08y - 616.89z = a$$
$$(B)\quad -208.05x + 731.08y + 637.39z = b$$
$$(C)\quad x + y + z = 1$$

The first elimination is simplified by the fact that equation *C* is in a very simple form. This fact is used to advantage in eliminating x, as shown in the two steps:

$$(A)\quad 294.80x - 684.08y - 616.89z = a$$
$$(D)\ (294.80 \times C)\quad 294.80x + 294.80y + 294.80z = 294.80$$
$$(E)\ (D - A)\quad 978.88y + 911.69z = 294.80 - a$$
$$(B)\quad -208.05x + 731.08y + 637.39z = b$$
$$(F)\ (208.05 \times C)\quad 208.05x + 208.05y + 208.05z = 208.05$$
$$(G)\ (B + F)\quad 939.13y + 845.44z = 208.05 + b$$

There are now two equations, *E* and *G*, in which *x* has been eliminated. To eliminate y, the first step is to divide each equation throughout by the coefficient of *y*.[5]

$$(H)\ (F \div 978.88)\quad y + .9314z = .3012 - .0010a$$
$$(I)\ (G \div 939.13)\quad y + .9002z = .2215 + .0011b$$
$$(J)\ (H - I)\quad .0312z = .0797 - .0010a - .0011b$$
$$(K)\ (J \div .0312)\quad z = 2.5545 - .0321a - .0353b$$

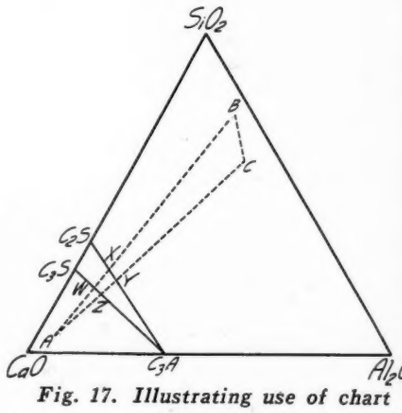


Fig. 17. Illustrating use of chart

It is assumed in equations *H* to *K* inclusive that a calculating machine, operated to give quotients with four decimal places, is being used. In the direct method, without subsequent corrections, it would be best to carry the coefficients of *a* and *b* to six decimal places (four significant figures). On account of the corrections to be applied later, it is possible to make the work entirely mechanical, without pausing at each step to consider the number of decimal places to be carried.

[5] This method is especially convenient if a calculating machine is available. The reciprocal of the coefficient of *y* can be calculated, then set on the keyboard, and used as a factor by which to multiply each of the coefficients in the equation. It is the best method to use in successive eliminations if the problem involves the control of three or more variables.

$$
\begin{array}{lll}
(L)\ (I\ \text{transposed}) & y = -.9002z + .2215 + .0011b \\
 & = -.9002\,(2.5545 - .0321a - .0353b) + .2215 + .0011b \\
(M) & = -2.0781 + .0289a + .0329b \\
(N)\ (C\ \text{transposed}) & x = 1 - y - z = 1 - (y + z) \\
(O) & = .5236 + .0032a + .0024b
\end{array}
$$

The approximate solution of the series of equations is:

$$
\begin{array}{lll}
(O) & x = & .5236 + .0032a + .0024b \\
(M) & y = & -2.0781 + .0289a + .0329b \\
(K) & z = & 2.5545 - .0321a - .0353b
\end{array}
$$

The first step in calculating corrections is to substitute these values of x, y and z in the left-hand members of the original equations, A, B and C, obtaining:

		Correct value
Eq. (A)	$0.0984 + .9756a - .0225b$	a
Eq. (B)	$0.0204 + .0022a + 1.0533b$	b
Eq. (B)	1.0000	1.0000

As indicated in the column at the right, these values should be a, b and 1.0000 respectively. The error in these values is found by subtracting from a, b and 1.0000 respectively, obtaining:

$$
\begin{array}{ll}
\text{Eq. } (A) & -.0984 + .0244a + .0225b \\
\text{Eq. } (B) & -.0204 - .0022a - .0533b \\
\text{Eq. } (C) & 0.0000
\end{array}
$$

These values are used in setting up "correction equations." In these equations the left-hand members are identical with the left-hand members of A, B and C, except that x_1, y_1 and z_1 are used instead of x, y and z. In these equations x_1 is the correction to be applied to x, y_1 the correction to be applied to y, etc. Since the equations which follow are identical in their left-hand members with the equations used in the original solution, only the first term will be given in each case. This is the most convenient form to follow in calculating corrections. The correction equations are:

$$
\begin{array}{ll}
294.80x_1 \ldots . = & -.0984 + .0244a + .0225b \\
-208.05x_1 \ldots . = & -.0204 - .0022a - .0533b \\
x_1 \ldots . = & 0.0000
\end{array}
$$

In order to conduct the solution of the correction equations in the same manner as the original solution (with the calculating machine set for a quotient of four decimal places) the decimal points in the right-hand members of the above equations are set four places to the right, which is equivalent to multiplying the coefficients by 10,000. The variables x_1, y_1 *and* z_1 are consequently replaced by x_2, y_2 and z_2, as shown below.

$$
\begin{array}{lll}
(A) & 294.80x_2 = -984 + 244a + 225b \\
(B) & -208.05x_2 = -204 - 22a - 533b \\
(C) & x_2 = 0
\end{array}
$$

In solving these equations, the various steps in the solution of the original equations are followed in detail, in order to take advantage of the fact that much of the work has already been done. The same letters are consequently used to designate the equations, and only the first term given in each case. By using this scheme a great deal of laborious computation is eliminated.

$$
\begin{array}{lll}
(A) & 294.80x_2 = -984 + 244a + 225b \\
(D)\ (294.80 \times C) & 294.80x_2 = 0 \\
\hline
(E)\ (D - A) & 978.88y_2 = 984 - 244a - 225b \\
(B) & -208.05x_2 = -204 - 22a - 533b \\
(D)\ (208.05 \times C) & 208.05x_2 = 0 \\
\hline
(G)\ (B + F) & 939.13y_2 = -204 - 22a - 533b \\
(H)\ (F \div 978.88) & y_2 = 1.0052 - .2493a - .2299b \\
(I)\ (G \div 939.13) & y_2 = -.2172 - .0234a - .5675b \\
\hline
(J)\ (H - I) & = 1.224 - .2259a + .3376b \\
(K)\ (J \div .0312) & = 39.18 - 7.24a + 10.82b \\
(L)\ (I\ \text{transposed}) & = -.9002z_2 - .2172 - .0234a - .5675b \\
(M) & = -35.49 + 6.49a - 10.31b \\
(N)\ (C\ \text{transposed}) & = -y_2 - z_2 \\
(O) & = -3.69 + .75a - .51b
\end{array}
$$

The correction values, x_1, y_1 and z_1, are obtained by moving the decimal points in equations (O), (M) and (K) respectively four places to the left.

$$
\begin{array}{l}
x_1 = -.000369 + .000075a - .000051b \\
y_1 = -.003549 + .000649a - .001031b \\
z_1 = .003918 - .000724a + .001082b
\end{array}
$$

The value of x, previously obtained as an approximation, is corrected by adding the value of x_1, as follows:

$$
\begin{array}{lll}
x = & .5236 & + .0032a + .0024b \\
x_1 = & -.000369 & + .000075a - .000051b \\
\hline
\text{Cor. } x = & .523231 & + .003275a + .002349b
\end{array}
$$

The values of y and z are corrected in the same manner. The corrected solution of the original equations is given below:

$$
\begin{array}{lll}
 & x = & .523231 + .003275a + .002349b \\
(32) & y = & -2.081649 + .029549a + .031869b \\
 & z = & 2.558418 - .032824a - .034218b
\end{array}
$$

These equations may be written to four decimal places if desired, as follows:

$$
\begin{array}{lll}
 & x = & .5232 + .0033a + .0023b \\
(33) & y = & -2.0816 + .0295a + .0319b \\
 & z = & 2.5584 - .0328a - .0342b
\end{array}
$$

(To be continued)

Concrete Attacked by Drinking Water

THAT cements and mortars and concrete may be dissolved in pure distilled water is well known. But the fact is of little practical importance because practically all natural waters contain carbonic acid and lime compounds which not only protect the concrete but actually close pores and cracks in reservoirs which hold water.

However, there are cases in which natural waters are so pure that it has some of the destructive effects of distilled water, and they are mentioned in an article on the subject in *L'Age du Ciment*, published by the (French) Lafarge company. One case was at Vannes, in a part of France where the soil is all granitic. The regular city water there is said to be slowly destructive to concrete made with portland and slag cements.

A second case mentioned is in England, at the works of the British Aluminum Co., which are likewise in a granitic region. The water is also peaty. The first constructions of this company were so rapidly attacked that the company spent considerable time and money investigating the subject of concrete corrosion and finally used an aluminous cement which had been shown to be immune to such attack.

"Keep Opportunists from Monkeying with Cement Chemistry"

"PERHAPS the cement manufacturer can be looked to for cements of better integral sealing qualities, and thus keep novices and opportunists from monkeying with his chemistry," L. A. Perry, consulting engineer, Seattle, Wash., says in his discussion of the paper, "Tests of Integral and Surface Waterproofings for Concrete," in the *Journal of the American Concrete Institute*. "It is just possible that a ground-in puzzuolanic material would be serviceable, since it combines with much of the free lime otherwise removed in solution by the flow of water through pores. It would probably also minimize shrinkage by the attendant crystal formation and limit the annoying compressive stresses set up in steel by shrinkage. This material has the effect of retarding hardening, so it appears that a puzzuolanic addition requires a compensating accelerator."

Engineers and the entire construction industry are interested in having a fool-proof method to get waterproof concrete, and the suggestion by Mr. Perry is that the cement manufacturer supply such a material.

Blast-Furnace Portland Cement

THE British Standards Institution has just issued a specification for blast-furnace portland cement to take the place of an earlier specification which appeared in 1926. Changes introduced include a clause which no longer makes the neat cement test obligatory. The 28-day mortar test has been replaced by a 3-day test, and the quantity of water for preparing the neat cement paste or cement and sand mortar is now to be determined by a modified Vicat needle.

Hints and Helps for Superintendents

Ground Detector for Electrical Distributing Systems

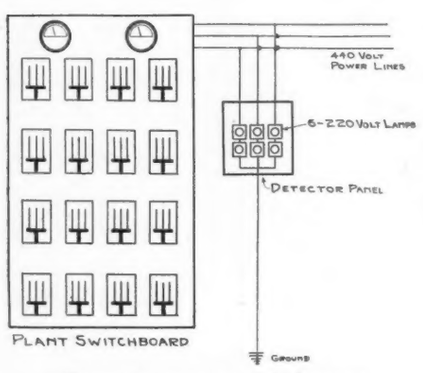
By W. R. Carmichael
Construction Engineer
St. Louis, Mo.

BECAUSE electrical distributing systems in most rock products plants are exposed to moisture and excessive vibration, they are subject to many disturbances. Probably the most common and annoying trouble is experienced when one or more of the leads in the plant wiring system becomes grounded.

In some cases the ground may be only a minor one and may continue, without discovery, for a long period of time. Aside from the waste of power, due to current leakage, this will cause no real damage. On the other hand, should the ground be a heavy one, it will either cause a fire at some point in the plant, or do serious damage to some of the electrical equipment, because of the heat generated in the machine.

To guard against such occurrences a simple ground detector may easily be made and attached by the plant electrician. This device will instantly and automatically indicate the presence of a ground and the attendant, by applying a simple test, is immediately able to determine the circuit in which the trouble is located.

For the ordinary three phase system the apparatus consists of six lamp sockets mounted on a supplementary panel board. As shown in the accompanying sketch, these sockets are wired in series with each of the three power supply leads and the ground. If the plant is supplied with current at 440 volts, a 220 volt lamp should be placed in each socket. If 220 volt current is used the lamps should be of 110 volt capacity. The supplementary panel board may be mounted at any convenient location in the switchboard room, as the operation of the detector is in no manner affected by the lengths of the leads from the power supply.



Prevents waste and damage

When the device has been installed the main switch of the plant should be closed and, if the circuits are free from grounds, the lamps will burn at normal brilliancy. Should any conductor become grounded, the lamps on that phase will be extinguished immediately and will not burn again until the ground has been removed.

This detector is positive in its action, for it depends solely upon the fact that current always follows the path of least resistance, and since the resistance offered by the lamps is greater than that offered by the ground, the lamps must necessarily cease to function when trouble of this kind is encountered.

When the detector indicates the presence of a ground the switches on the main panel board controlling the individual plant units are opened and closed, one at a time. When the switch operating the grounded circuit is opened the extinguished lamps will immediately light.

Should it be desired to make an installation of this nature in a plant where an electrician is not constantly in charge of the switchboard, relays of suitable capacity may be installed in place of the lamps, and these relays in turn connected with an electric bell or siren, so located that its signal will be heard, when trouble occurs.

The scale man's voice carries throughout the yard

Annunciator for Scale Man

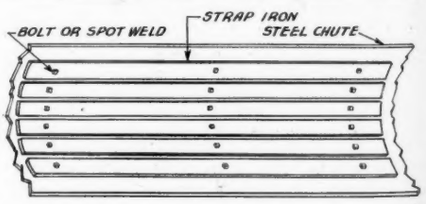
DELAY at the scale and about the yard is largely eliminated at the Long Beach (Calif.) yard of Graham Bros., Inc. This is accomplished by a simple adaptation of the loud speaker for carrying instructions from the scale man to the truck drivers.

A microphone has been installed in the office of the scale man, and at several places in the yard annunciator horns have been erected so that when the scale man wishes to give orders to a truck driver he simply talks in a modulated voice into the "mike." The sound of his voice has been amplified to a sufficient volume that it can be heard for a block, even amid the noise and bustle of a busy aggregate yard.

Reclaiming Round Bottom Steel Chutes

By Dare Paris
Monrovia, Calif.

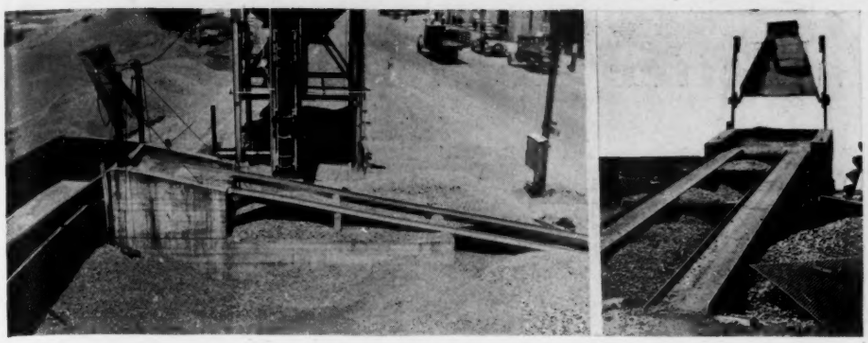
HERE is a method for reclaiming old round bottom steel chutes. Around many rock products plants may be seen, discarded, chutes which have become worn



through the center, although the rest shows little wear. A simple method for reclaiming these is to line the bottom of the chute with ¼- to ½x3-in. strap iron bolted or spot-welded to the bottom of the old chute. If or when these become worn they may be taken out and replaced with new ones. One or more may be replaced at a time.

Loading Railroad Cars Directly from Trucks

THE Bedford Nugent Co. of Evansville, Ind., found it necessary to load railroad cars directly from trucks and installed the ramp which is shown to make such loading economical. The runway consists of a concrete base and two 12 in. channel irons sup-



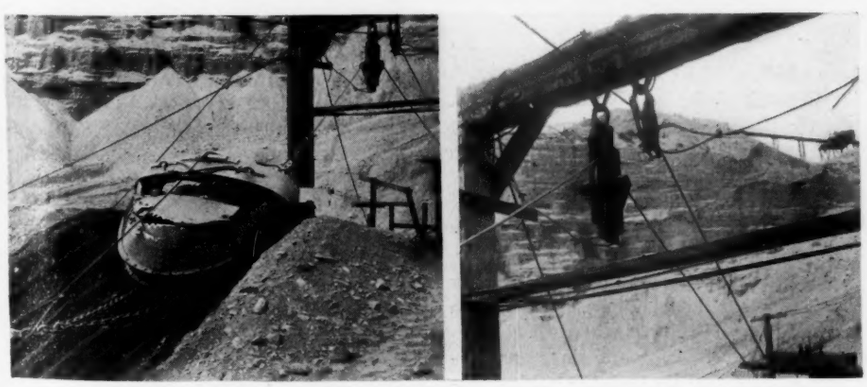
Channel irons make elevated roadway for dumping trucks to cars

ported at intervals as shown. The metal chute, to which the trucks dump, is pivoted so that it can be drawn up out of the way when a locomotive passes, but returns to its position when a car is to be filled. Such a chute could be made from a skip of an old concrete paving mixer, the only change necessary being to pivot from the large end instead of the small end.

Home-Made Blocks

THE USE of drag scrapers by sand and gravel producers in southern California is quite general and in such districts as the San Fernando Valley district they make possible low excavation costs. The gravel deposits are deep and free-flowing and there are no large boulders to contend with. There seems to be a tendency for deeper excavations rather than lateral expansion, so that many of the operators have lowered their excavating equipment, drum hoist and all, into these deep pits and drag the material to an inclined belt that serves the plant. A typical example is the Reybern Ave. plant of Graham Bros. Inc., at Long Beach. A similar instance is at the El Monte plant near Pasadena.

At both of these plants the main lead block over the dump hoppers is home-made and of substantial design. The blocks have an over-all length of 4 ft. and are made primarily of 5/8-in. steel plates. A bracket has been welded on each side to act as a bearing support. The upper, or invert, section of the bearing is also of plate construction and is bolted to the lower half so that the bearings can be rebabbitted conveniently. The two illustrations show the arrangement of the block with relation to the remainder of the equipment. A 3-yd. Sauerman drag scraper is used at both plants.



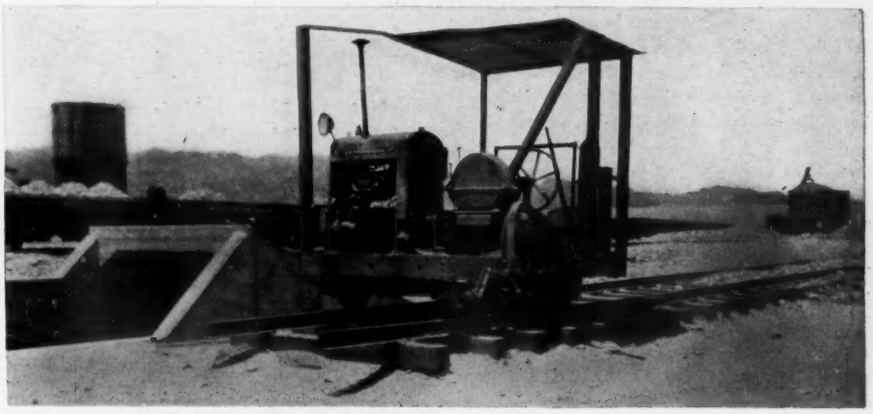
Home-made blocks have distinctive features

Finds Track Shifting Device Valuable Adjunct

WHEN the Six Companies, Inc., start to do a job they do it right. Even though the sand and gravel plant is temporary, the economies of supplying the workmen with the most efficient equipment pays dividends, this company has found, and it is following this principle throughout its entire work in the construction of Hoover Dam.

One of the many labor-saving devices which it uses is the Nordberg track shifter powered by a Hercules gasoline motor, both of which are shown in the accompanying illustration.

The pit is about seven miles from the screening and washing plant and is served by a standard gage railroad. Spur tracks and switching facilities are provided at both ends of the haul and the Nordberg track shifter has more than paid for itself on this work, and will pay added dividends when it is necessary to shift the tracks at the pit, the operators report.



Finds track shifter an important tool for low production cost

Attaching Sockets to Wire Ropes

By W. E. Warner
Herts, England

WHEN attaching sockets to wire ropes, at the end of the rope where the socket is to be attached, measure a length equal to the basket of the socket to be attached.

Just above this spot bind tightly with wire to prevent the strands unraveling. The strands should then be separated (if the rope has a hemp core this should be cut out) and the strands should be straightened.

A solution should be made up from equal parts muriatic acid and water, and the strands dipped in this nearly up to the wire binding. The strands should be immersed 30 sec., then wiped dry with a cloth. They should then be put in the basket of the socket and distributed so that the socket is in line with the axis of the rope.

Secure the socket in a vertical position and place fireclay which has been preheated to 250 deg. F. around the bottom.

Zinc should then be melted and poured into the socket until full, more zinc being added as cooling occurs to make up for contraction which takes place. The cooling should be in air but the air circulation may be improved by an electric fan if so desired. Solder or babbitt give a much inferior strength to zinc and should not be used.

Editor Shaw's Letter from Los Angeles

Graham Bros., Long Beach Aggregate and Concrete Producers Typify "Unshaken in Faith and Courage. United for a Greater Future"

THEY SAY that it is an ill wind that blows nobody some good, and I can see that the earthquake of last month is already having a considerable effect on the building material business. Every time I go to town I see two or three trucks loaded with aggregate and I hardly saw more than one in every two or three trips a month ago. The crowds of idle men along Main street and on Fifth street down towards the S. P. station are noticeably smaller, although they are still large. And when one gets into the district where the quake was strongest the sight of rising scaffolding and form work gives the impression of great activity.

I am told that this does not mean so much in tonnage as most of the work being done is repair work, and a job may need anything from a yard or two to hundreds of yards of concrete. Money is still lacking to do the big things. But everyone knows that money will be found eventually, and a few architects are already busy with plans for new work. Undoubtedly the shaken portions will be built up better than they were before, and that is saying something for few cities anywhere were so well built as Long Beach.

Being Americans, we are still optimistic, and we feel that the future looks better than it did before this shock. Graham Bros. have posters all over Long Beach and vicinity (advertising the crushed rock, sand and gravel and mixed concrete they produce) which exactly express the feeling. They read: *Unshaken in Faith and Courage. United for a Greater Future.*

Repair of Concrete Construction

I thought I knew quite a bit about concrete, but during a recent visit to Long Beach to study the repair methods being used I had to admit that I did not half appreciate its possibilities. The visit was at the invitation of George Adams Roalfe, well known to many Rock Products readers, who (after doing his share of inspecting damaged buildings for the city) is now with one of the three companies in Long Beach that specialize on gunite repairing. The methods used are so interesting and they point to so much wider and different uses of concrete that they are worth describing here.

Years ago, when gunite was introduced, those who promoted it let the impression get out that it was expensive. It surprised me to learn that on this repair work it competes on a price basis with poured concrete and masonry. Part of this cheapness is due to the fact that a hose may be run anywhere and to any reasonable height. Repairs have been made in Long Beach 200 ft. above the ground, the concrete being pumped all the way in the hose. The form work for gunite is usually simpler, and that saves something. And now that there are no patent restrictions on the use of gunite, there is open competition among contractors and with competing materials.

Changing Brick to "Class A" Construction

The most interesting work to me was that of changing brick buildings of ordinary construction to "Class A" construction, as one would classify a reinforced-concrete frame with brick filler walls. I saw this being done to an apartment hotel without interfering in the least with the use of the building by the tenants. The beams and columns of the frame are made right in the brick work. Where a beam is wanted a channel is cut in the wall as long as is practicable, a cage of reinforcing bars is pushed in and the channel shot full of gunite. The channel is then cut further, reinforcing is inserted and welded to the first reinforcing, and more gunite is shot in. And this is carried on until a belt of reinforced concrete runs around the building. Vertical cuts are made and filled with reinforcing and gunite to make columns, and the firewall at the top is made as a reinforced concrete girder, strong enough to hang parts of the construction from, if this is advisable. In some cases, where there is a problem of support, short cuts are made and filled, leaving uncut sections which are afterward cut out and filled to make the continuous beam or column. All this is possible because gunite bonds perfectly, new to old, and there are no joints or weak places where the sections are united.

Concrete Frame Poured in Brick-Walled Building

The most amazing job of this kind that I saw was the repairs to a mortuary chapel, really a fair sized church. It was of Gothic type and the front brick walls were 36-in. thick and the back walls were 22-in. thick because of the deeply recessed doors and windows. The trimming was of concrete art stone which suffered little or no damage, although much of the building came down. A concrete frame has been inserted, light gunite walls replace the heavy brick walls in some parts, the art stone has been put back and anchored to the frame and the structure looks the same as before, but it is safe in any ordinary earth movement.

The stability of concrete frame with brick filler walls has been proven. Mr. Roalfe designed two such structures a few years ago, treating the brick walls simply as curtains, and they went through the quake without a check or a crack.

Many buildings were found safe enough except for cracks in the walls. These were treated quite simply by chasing a channel across the crack, putting in a cage of reinforcing and shooting in the gunite. Two or more of these are put in if the crack is long. Mr. Roalfe was brought up in Mexico City, where there was considerable earthquake damage. The Mexican brick masons repaired cracked structures by cutting a channel across the crack and setting in a piece of flagstone. The use of gunite is only an improvement on this old method.

Out of this work has grown a new form of construction called "two-wall construction." In a typical example columns, 8 x 8 in., are formed on three sides around reinforcing and shot with gunite. Then ¾-in. channels are set in line with the faces of the columns, inside and out, and covered with a steel fabric of some kind and a 2-in. gunite wall is built on this. The thickness of the column is increased 2-in. on each side, and it is firmly bonded to the two strong walls inside and out, with an insulating space between. This construction has already been used to replace or add to upper stories and it will undoubtedly be used for complete structures. A patent has been applied for.

All repairs and new work are being thoroughly inspected and only approved methods and materials may be used. Political pull and social standing would serve to except no one from this rule. Every effort is being made to make construction as safe as possible under the circumstances and everything is being approved by a competent engineer. And a market is being created for the rock products producer.

Quarry Accidents in 1932

EARLY REPORTS for 1932 received by the United States Bureau of Mines and covering approximately 34% of all quarry workers in the United States, show an accident-frequency rate in 1932 that was almost identical with the rate for the same companies in the year before. The accident-prevention experience of these companies revealed a rate of 29.69 lost-time accidents per million man-hours of exposure in 1932 as compared with 30.10 in 1931. Final figures covering the whole quarrying industry in 1931 indicated a rate of 41.04 accidents per million man-hours.

Physical Properties of Slate

A REPRINT of the article, "Physical Properties and Weathering Characteristics of Slate," which was published in the *Bureau of Standards Journal of Research,* has been issued by the Department of Commerce as Research Paper 477.

Editorial Comment

Needed Public Works

At this writing there is little definite information available as to what kind of public works the administration at Washington has in mind, as a part of its announced reconstruction program. Apparently a bond issue of modest dimensions is in prospect, and it seems likely that the proceeds will be loaned or advanced to the various states to be used as they may determine. There seems to be considerable opposition on the part of some administration officials to large expenditures for highways; there is much more sentiment in favor of local public works such as sewage treatment plants, water works, flood prevention, grade-crossing elimination and housing projects.

It is possible to assemble many more arguments, or justification, for such local improvements. First, because there is an obvious need, said to have accumulated to the extent of several billion dollars' worth of construction, all planned and ready to start; second because it will provide employment in metropolitan centers, where the money must come from, and where the bulk of unemployment exists. A third reason, that has not been given much publicity is that public health and safety in numerous instances demand that something be done. City streets have been so neglected in some cases as to be hazardous; water-supplies are endangered by neglect of needed work, and the conditions of many of our streams are disgraceful to a civilized community.

Price, Profit and Prosperity

We have always urged producers in this industry to stand firm for prices that yield fair profits. It is especially important that they do so today; for in many instances producers have shown the "guts" to advance prices; and as a result they are being subjected to savage attacks by organized groups of purchasers, such for example as state highway departments. We do not urge profitable prices from partisanship for this industry; had we a medium that reached any other industry, or all other industry, we would make the same plea, the same arguments. For as long as our organized society depends on the present capitalistic system of political economy, it must be obvious that profit in industry (the margin between cost of production and selling price) is the one and only source of capital upon which construction or any other capital absorbing enterprize can draw. To prove this, one has only to apply the reasoning to his own business, or to his own household. Needed and desirable investment in equipment or real estate can not be made in your business, or by your household, until you have acquired a surplus, or some one else, from the earnings of an industry, has acquired a surplus that you can borrow. Surplus is profit. If there is no surplus, business and industry are static and will remain so.

The Federal Government may spend one billion or five billion dollars for public works, but at the end, unless the producers of construction materials and the contractors are allowed a margin of profit, we shall be no nearer a solution of our problem of reviving industry and business than we are today. We will have spent the money for labor and saved so much in direct doles, surely, but we will not have returned the necessary share of surplus money or credit back into normal channels of trade expansion, and the program will prove a flop as a business accelerator. The government will be just so much deeper in debt, with no revival of general business to tax to pay interest or recover principal.

The 30-Hour Work Week

No one seems very much excited about the 30-hour week bill which was rushed through the United States Senate and is now up for action by the House of Representatives. Perhaps lack of energetic opposition is due to a general belief that the law would soon be declared unconstitutional, or perhaps to the general lethargy of business men. Probably few business executives today are opposed to the principle of shorter working days, or shorter working weeks. Moreover, in the rock products industry, and many other basic material industries, labor has had, for several months anyhow, little opportunity to work more than an average of 30 hours a week for the period as a whole.

The survey of the labor situation in the rock products industry published in our Annual Review Issue, December 31, 1932, pp. 63-64, showed quite conclusively that there has been a universal and sincere effort to spread the work among as many employes as possible, but as was written then, in practically all these industries, with the possible exception of the portland cement industry, work and employment are seasonal, and any project to establish a 30-hour week is absurd. The goal to be attained, for the benefit of labor itself, is a minimum number of hours per year, rather than per day or per week—a minimum number of hours that labor may earn enough to subsist.

Also, the rock products industries are essentially local in character, and a 30-hour week applied to products in interstate commerce, and a 48-hour or 60-hour week for products used within state borders, would create a chaotic condition.

The rock products industry in general lends itself remarkably well to the scheme of part work in industry and part work on one's own little farm. Of course, the season which calls for work in production of rock products is also the season for farm work; but the possibilities of combining the two, as has already been done in numerous instances, is well worth the study of every producer.

Recent Quotations on Rock Products Securities

Stock	Date	Bid	Asked	*Dividend
Allentown P. C. 1st 6's[47]	4-18-33	No market		
Alpha P. C. com.	4-19-33	9	10	25c qu. Apr. 25
Alpha P. C. pfd.	4-18-33	65		1.75 qu. Mar. 15, '33
Amalgamated Phos. 6's, '36[47]	4-18-33	91	93	
American Aggregates com.[47]	4-18-33	1	2	
American Aggregates pfd.[47]	4-18-33	9	11	1.75 qu. Jan. 1
American Aggregates 6's w.w.[47]	4-18-33	30	32	
American Aggregates 6's ex-w.[47]	4-18-33	24	26	
Amer. L. & S. 1st 7's[47]	4-18-33	35	38	
Arundel Corp. com.	2-18-33	12½	13½	50c qu. Apr. 1, '33
Bessemer L. & C. Class A[47]	4-18-33	1	2	
Bessemer L. & C. 1st 6½'s[47]	4-18-33	17½	19½	
Bessemer L. & C. cert. of dep.[47]	4-18-33	15	17	
Bloomington Limestone 6's[47]	4-18-33	No market		
Boston S. & G. new com.[37]	3-14-33	1	3	5c qu. July 1
Boston S. & G. new 7% pfd.[37]	3-14-33	10	20	1.75 qu. Jan. 3, '33
Boston S. & G. 7's, 1934[39]	3-14-33	50	60	
California Art Title, A	3-18-33	½	1	
California Art Title, B[9]	3-18-33		¾	
Calaveras Cement com.	4-19-33	1	4	
Calaveras Cement 7% pfd.	3-18-33	47	60	1.75 qu. Apr. 15,'33
Canada Cement com.	4-18-33	2¾ actual sale		
Canada Cement pfd.	4-18-33	13¼ actual sale		1.62½ qu. June 30
Canada Cement 5½s, 1947	4-18-33	51	53	
Canada Crushed Stone bonds[42]	3-15-33	71½		
Canada Crushed Stone com.[42]	3-15-33	No market		
Certainteed Products com.	4-19-33	1¼	1½	
Certainteed Products pfd.	4-17-33	5⅛	12	1.75 qu. Jan. 1
Certainteed Products 5½'s, 1948	4-18-33	31½ actual sale		
Cleveland Quarries	4-18-19		25	10c qu. Dec. 1
Consol. Cement 1st 6½'s, A[47]	4-18-33	2	4	
Consol. Cement pfd.[47]	4-18-33	No market		
Consolidated Oka Sand and Gravel (Canada) 6½'s[12]	3-15-33		35	
Consolidated Oka Sand and Gravel (Canada) pfd.[42]	12-27-32		50	
Consol. Rock Prod. com.[47]	4-18-33	15c	20c	
Consol. Rock Prod. pfd.[47]	4-18-33	30c	40c	
Consol. Rock Products units[47]	4-18-33	35c	50c	
Consol. S. & G. pfd. (Can.)	1-16-33		50	50c qu. Nov. 15
Construction Mat. com.	1-16-33	⅛	1	
Construction Mat. pfd.	3- 2-33	1⅛	4½	
Consumers Rock and Gravel 1st Mtg. 6's, 1948[47]	4-18-33	20	25	
Coosa P. C. 1st 6's[47]	4-18-33	14	18	
Coplay Cem. Mfg. pfd.[47]	4-18-33	5	7	
Coplay Cem. Mfg. 6's, 1941[47]	4-18-33	55	65	
Dewey P. C. com.[47]	4-18-33	50	60	
Dolese and Shepard	4-18-33	6	8	$1 qu. Jan. 1
Dufferin Pav. & Cr. Stone pfd.	4-18-33	8 actual sale		1.75 qu. Apr. 1
Dufferin Pav. & Cr. Stone com.	4-18-33	1 actual sale		
Edison P. C. com.[47]	4-18-33	1	3	
Edison P. C. pfd.[47]	4-18-33	3	5	
Federal P. C. 6½'s, 1941[47]	4-18-33	55	60	
Giant P. C. com.[47]	4-18-33	2	4	
Giant P. C. pfd.[47]	4-18-33	5	7	
Gyp. Lime & Alabastine, Ltd.	4-14-33	1¾ actual sale		
Gyp. Lime & Alabastine 5½'s, 1948	4-18-33	29	31	
Hermitage Cement com.[47]	4-18-33	5	7	
Hermitage Cement pfd.[47]	4-18-33	20	25	
Ideal Cement 5's, 1943[47]	4-18-33	78	81	
Ideal Cement com.[47]	4-18-33	11	12	25c qu. Apr. 1, '33
Indiana Limestone 6's[47]	4-18-33	No market		
International Cem. com.	4-19-33	14¼	14½	50c qu. Mar. 31
International Cem. bonds, 5's	4-18-33	58 actual sale		Semi-ann. int.
Kelley Island L. & T.	4-18-33	7	7½	25c qu. Jan. 2, '33
Ky. Cons. Stone com.[47]	4-18-33	No market		
Ky. Cons. Stone 7% pfd.[47]	4-18-33	No market		
Ky. Cons. Stone 1st Mtg. 6½'s[47]	4-18-33	4	6	
Ky. Cons. St. V. T. C.[47]	4-18-33	No market		
Ky. Rock Asphalt com.	4-17-33	¾	1¼	
Ky. Rock Asphalt pfd.	4-17-33	8½	12	
Ky. Rock Asphalt 6½'s, '38	4-17-33	53	55	
Lawrence P. C.	4-17-33	4	7	
Lawrence P. C. 5½'s, 1942[47]	4-18-33	37	40	
Lehigh P. C. com.	4-19-33	9¾	11	
Lehigh P. C. pfd.	4-17-33	43⅛	65	87½c qu. Apr. 1, '33
Louisville Cement[47]	4-18-33	40	45	
Lyman-Richey 1st 6's, 1935[13]	3-15-33	85	95	(nominal)
Marbelite Corp. com. (cement products)	3-13-33	5c	50c	
Marbelite Corp. pfd.	3-13-33	25c		
Marquette Cement com.[47]	4-18-33	7	8	
Marquette Cement pfd.[47]	4-18-33	38	41	1.50 qu. Jan. 3, '33
Marquette Cem. Mfg. 1st 5's, 1936[46]	4-18-33	55	(nominal)	
Marquette Cem. Mfg. 1st 6's, 1936[46]	4-18-33	60	(nominal)	
Material Service Corp.[47]	4-18-33	6	7½	
McCrady-Rodgers 7% pfd.[22]	3-14-33	25	30	87½c qu. June 30
McCrady-Rodgers com.[22]	3-14-33	No market		75c qu. Jan. 26
Medusa P. C. pfd.[47]	3-21-33	25	30	1.50 qu. Apr. 1
Medusa P. C. com.[47]	4-18-33		6	
Michigan L. & C. com.[47]	4-18-33	50	54	
Missouri P. C.[47]	4-18-33	6	7	25c qu. Jan. 30
Monarch Cement com.[47]	4-18-33	35	40	
Monolith Portland Midwest	4-16-33		1	
Monolith P. C. com.	4-10-33	1		40c s.-a. Jan. 1
Monolith P. C. pfd.	4-10-33	1⅝		40c s.-a. Jan. 1
Monolith P. C. units[47]	4-18-33	1	1½	
Monolith P. C. 1st Mtg. 6's[47]	4-18-33	50	55	
National Cem. (Can.) 1st 7's	2-21-33	70	80	(nominal)
National Gypsum A com.	4-19-33	2	2½	
National Gypsum pfd.	4-19-33	40	42	1.75 qu. Apr. 1, '33
National Gypsum 6's[47]	4-18-33	70	75	
National L. & S. 6½'s, 1941[47]	4-18-33	68	72	
Nazareth Cement com.[47]	4-18-33	2	4	
Nazareth Cement pfd.[47]	4-18-33	10	15	
Newaygo P. C. 1st 6½'s[47]	4-18-33	25	30	
New England Lime 6's, 1935[14]	2-16-33	10	(nominal)	
N. Y. Trap Rock 1st 6's	4-17-33	40¾	actual sale	
N. Y. Trap Rock 7% pfd.	2-21-33		50	1.75 qu. Jan. 3, '33
North Amer. Cem. 1st 6½'s[47]	4-18-33	7½	10	
North Amer. Cem. com.[47]	4-18-33	½	1	
North Amer. Cem. 7% pfd.	4-18-33	1	2	
North Shore Mat. 1st 6's[47]	4-18-33	30	35	
Northwestern States P. C.[47]	4-18-33	25	30	
Ohio River S. & G. com.	4-17-33		5	
Ohio River S. & G. 1st pfd.	4-17-33		50	
Ohio River S. & G. 2d pfd.	4-17-33		20	
Ohio River S. & G. 6's[47]	4-18-33	35	40	
Oregon P. C. com.[47]	4-18-33	5	10	
Oregon P. C. pfd.[47]	4-18-33	70	75	
Pacific Coast Aggr. com.[40]	3-13-33		1	
Pacific Coast Aggr. pfd.[40]	3-13-33		2	
Pacific Coast Aggr. 6½'s, 1944[5]	12-23-32	10	11	
Pacific Coast Aggr. 7's, 1939[5]	12-23-32	3	5	
Pacific Coast Cement 6's[5]	2-28-33	35	39	
Pacific P. C. com.	4- 2-33	3	actual sale	
Pacific P. C. 6½'s pfd.	4-16-33	20	25	1.62½ qu. Jan. 5, '33
Pacific P. C. 6's, 1935[47]	3-23-33	83	85	
Pacific P. C. 6's, 1936[47]	3-23-33	83	85	
Peerless Cement com.[47]	4-18-33	25c	35c	
Peerless Cement pfd.[47]	4-18-33	2	3	
Penn.-Dixie Cement com.	4-19-33	1¾	2	
Penn.-Dixie Cement pfd.	4-18-33	5	7¼	
Penn.-Dixie Cement 6's	4-19-33	41	actual sale	
Penn. Glass Sand Corp. pfd.[47]	4-18-33	35	40	1.75 qu. Apr. 1
Penn. Glass Sand Corp. 6's[47]	4-18-33	70	75	
Petoskey P. C.[47]	4-18-33	1½	2	
Petoskey Portland Cement 6's, 1941	4-18-33	27		
Port Stockton Cem. com.[9]	3-18-33	No market		
Riverside Cement, A[47]	4-18-33	4	5	
Riverside Cement, B[47]	4-18-33	1	1½	
Riverside Cement pfd.[47]	4-18-33	50	55	1.50 qu. May 1, '33
Sandusky Cement 6's[47]	4-18-33	35	40	
Sandusky Cement 6½'s, 1932-37[47]	4-18-33	65	70	
Santa Cruz P. C. com.[47]	4-18-33	42	44	$1 qu. Apr. 1, '33
Schumacher Wallboard com.[47]	4-18-33	2	3	
Schumacher Wallboard pfd.[47]	4-18-33	4	5	50c qu. May 15
Signal Mt. P. C. pfd.[47]	4-18-33	4	6	
Southwestern P. C. units[47]	4-18-33	100	110	
Southwestern P. C. com.[47]	4-18-33	10	15	$1 qu. Jan. 1, '33
Southwestern P. C. pfd.[47]	4-18-33	55	60	$2 qu. Jan. 1, '33
Standard Paving & Mat. (Canada) com.	3-17-33	¾ actual sale		
Standard Paving & Mat. pfd.	3-17-33	No market		50c qu. Nov. 15
Superior P. C., A[47]	4-18-33	25	28	27½c mo. May 1, '33
Superior P. C., B[47]	4-18-33	5	6	12½c Dec. 20
Trinity P. C. units[47]	4-18-33	14	16	
Trinity P. C. com.[47]	4-18-33	2	3	
Trinity P. C. pfd.[47]	4-18-33	8	10	
U. S. Gypsum com.	4-19-33	28	29	40c qu. Apr. 15,'33
U. S. Gypsum pfd.	4-19-33	104	110	1.75 qu. Apr. 1,'33
Wabash P. C.[47]	4-18-33	4	5	
Warner Co. com.[47]	4-18-33	2	3	
Warner Co. 1st 7% pfd.[47]	4-18-33	15	20	1.75 qu. Apr. 1
Warner Co. 6's, 1944, w. w.	4-12-23	12¾	35	
Whitehall Cem. Mfg. com.[47]	4-18-33	7	9	
Whitehall Cem. Mfg. pfd.[47]	4-18-33	18	20	
Wiscon. L. & C. 1st 6's, 33[47]	4-18-33	50	55	
Wiscon. L. & C. 6½'s[47]	4-18-33	50	55	
Wolverine P. C. com.[47]	4-18-33	1	2	
Yosemite P. C., A com.[47]	4-18-33	1½	1¾	

*Latest 1932 dividend unless otherwise stated.

Quotations by: [1]Watling Lerchen & Hayes Co., Detroit, Mich. [2]Bristol & Willett, New York. [3]Rogers, Tracy Co., Chicago. [4]Butler, Wick & Co., Youngstown, Ohio. [5]Smith, Camp & Riley, San Francisco, Calif. [6]Frederick H. Hatch & Co., New York. [7]J. J. B. Hilliard & Son, Louisville, Ky. [8]Dillon, Read & Co., Chicago, Ill. [9]A. E. White Co., San Francisco, Calif. [10]Lee Higginson & Co., Boston and Chicago. [11]J. W. Jakes & Co., Nashville, Tenn. [12]James Richardson & Sons, Ltd., Winnipeg, Man. [13]Stern Bros. & Co., Kansas City, Mo. [14]First Wisconsin Co., Milwaukee, Wis. [15]Central-Republic Company, Chicago, Ill. [16]G. M. P. Murphy & Co., Baltimore, Md. [17]Citizens Southern Co., Savannah, Ga. [18]Dean, Witter & Co,, Los Angeles, Calif. [19]Hewitt, Ladin & Co., New York. [20]Tucker, Hunter, Dulin & Co., San Francisco, Calif. [21]Baker, Simonds & Co., Inc., Detroit, Mich. [22]Peoples-Pittsburgh Trust Co., Pittsburgh, Penn. [23]Howard R. Taylor & Co., Baltimore. [24]Richards & Co., Philadelphia, Penn. [25]Hincks Bros. & Co., Bridgeport, Conn. [26]Bank of Republic, Chicago, Ill. [28]Chicago Trust Co., Chicago, Ill. [29]Boettcher-Newton & Co., Denver. [30]Hanson and Hanson, New York. [31]S. F. Holzinger & Co., Milwaukee, Wis. [32]Tobey and Kirk, New York. [33]Steiner, Rouse and Co., New York. [34]Jones, Heward & Co., Montreal, Que. [35]Tenney, Williams & Co., Los Angeles, Calif. [36]Stein Bros. & Boyce, Baltimore, Md. [37]Wise, Hobbs & Arnold, Boston. [38]E. W. Hays & Co., Louisville, Ky. [39]Blythe Witter & Co., Chicago, Ill. [40]Martin Judge Co., San Francisco, Calif. [41]A. J. Pattison Jr. & Co., Ltd., Toronto, Canada. [42]Nesbitt, Thompson & Co., Toronto. [44]E H. Rollins, Chicago. [45]Dunlap, Wakefield & Co., Louisville, Ky. [46]First Union Trust & Savings Bank, Chicago. [47]Anderson Plotz and Co., Chicago, Ill. [48]Hemphill, Noyes and Co., New York City.

Financial News in Brief

Recent Dividends

Arundel Corp. (com.)	$0.50	April 1
Lehigh P. C. Co. (pref.)	.87½	April 1
Riverside Cement Co. (c. pref.)	1.50	May 1
Santa Cruz P. C. Co. (com.)	1.00	April 1

Dividends Omitted

Boston Sand and Gravel Co. (pref.) ..... Passed April 1
(Last dividend $0.87½ quar., Jan. 3, 1933.)
Kelley Island L. & T. Co. ..... Passed April 1
(Last dividend $0.25 quar., Jan. 3, 1933.)
New York Trap Rock Corp. (pref.) ..... Passed April 1
(Last dividend $1.75 quar., Jan. 3, 1933.)
Pacific P. C. Co. (c. pref.) ..... Passed April 5
(Last dividend $1.62½ quar., Jan. 3, 1933.)
Superior P. C. (A-monthly) .27½ ..... Passed May 1

American Aggregates Corp., Greenville, Ohio, reports sales in 1932 as compared with 1931 as follows:

	1932	1931
Net sales	$903,791	$1,883,355
Cost of sales	802,832	1,330,314
Depreciation	349,297	381,650
Depletion	18,881	36,286
Selling, administrative and general expenses	239,253	344,705
Operating loss	506,473	209,600
*Other income	87,231	235,177
Total income	(d)419,242	25,577
Interest and discount	99,661	118,640
Other deductions	5,685	.....
Net loss	524,587	93,064

The deficit amounted to $3.46 per share of common stock in 1932 and $1.17 in 1931. Plant and equipment have been written down from $5,207,357 in 1931 to $4,599,080 in 1932; total assets from $7,390,310 to $6,252,866. Current assets on December 31, 1932, were $406,407; current liabilities $251,406. On April 3 the corporation proposed a new financial setup to its security holders to reduce its present fixed charges of $161,050 per year; holders of 6% debenture bonds ($1,017,500) would receive new first mortgage bonds of equal amount with 3% fixed interest and 3% as earned. Instead of a fixed sinking fund of $100,000 per year, 15% of net income before depreciation and depletion to be used for sinking fund. Bond holders would retain stock purchase rights and acquire additional stock purchase rights. Stockholders of 7% preferred stock ($1,785,100) would concede accumulated dividends ($127,757) and the cumulative feature of their stock, and would receive a bonus of common stock, the right to purchase additional common stock. Common stockholders would concede a 20.9% dilution of equity when all stock warrants are exercised.

♦ ♦ ♦

Lehigh Portland Cement Co., Allentown, Penn., for the year ended December 31, 1932, reported:

Sales, less discounts, allowances, etc.		$6,386,394.40
Manufacturing and shipping cost (exclusive of depreciation and depletion)		5,114,099.61
		$1,272,294.79
Selling, administrative and general expenses		1,809,160.71
Loss		$ *536,865.92*
Miscellaneous income		319,687.25
Loss		$ *217,178.67*
Provision for depreciation, depletion and accrued renewals		1,781,010.39
Net loss for the year*		*$1,998,189.06*

*Does not include any proportion of the loss of Great Lakes Portland Cement Corp.

For the 12 months ended March 31, 1933, the company reported a loss of $2,164,166, or $7.87 per share of common stock. Total assets were written down from $50,945,724 to $45,599,281. Current assets as of December 31, 1932, were $11,805,197 and current liabilities $440,393, as compared with $16,390,751 and $487,784, respectively, in 1931. Accounts and bills receivable (net) were $434,378 in 1932 against $1,141,894 in 1931.

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Great Lakes Portland Cement Corp., Buffalo, N. Y., for the year ended December 31, 1932, showed a net loss of $562,867 (or $12.51 per share). Current liabilities were $767,204 (of which $686,186 was due the Lehigh Portland Cement Co., affiliated) against $417,165 current assets.

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International Cement Corp., New York City, and subsidiaries, report for the year ended December 31, 1932, a net loss of $1,436,367 after taxes, interest, depreciation, depletion and other charges. This compares with net profit in 1931 of $1,358,213 equal to $2.13 a share on 636,450 no-par shares of capital stock. Current assets as of December 31, 1932, including $2,632,245 cash, were $9,079,776 and current liabilities $1,622,385. This compares with cash of $2,445,858, current assets of $9,711,528 and current liabilities of $1,368,048 at close of previous year.

Consolidated income account for year 1932, compares as follows:

	1932	1931
Sales	$11,108.602	$20,087,148
Costs and expenses	8,406,677	14,624,098
Profit	$ 2,701,925	$ 5,463,050
Other income	104,723	298,049
Total income	$ 2,806,648	$ 5,761,099
Depreciation and depletion	2,958,293	2,906,863
Interest, etc.	992,620	990,946
Federal taxes, etc.	292,102	505,077
Net loss	$ 1,436,367	$ 1,358,213
Common dividends	313,481	2,357,016
Sub dividends	.....	294
Deficit	$ 1,749,848	$ 990,097
Profit and loss surplus	10,935,508	12.699,738

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Arundel Corp., Baltimore, Md., has issued its report on operations in 1932. The balance sheet and statement of surplus follow:

BALANCE SHEET OF THE ARUNDEL CORP. AS OF DECEMBER 31, 1932

ASSETS

December 31,1932

Current assets:		
Cash	$ 132,924.33	
Marketable securities at cost (market value $1,711,687.50)	1,729,264.83	
Accounts receivable, trade	1,075,553.89	
Accounts and notes receivable from affiliated corporations	37,153.67	
Notes receivable	5,740.85	
Accrued interest and sundry debtors	26,060.92	
Materials and supplies	30,802.14	
		$3,037,500.63
Investments and deferred assets:		
Other accounts receivable	$ 87,826.09	
Stock of the Arundel Corp., 3000 shares, at cost	135,571.25	
Insurance fund cash and securities, including 2161 shares of stock of the Arundel Corp. at cost ($64,761.03) per contra	160,179.95	
Other stocks and bonds, at cost	466,712.00	
Mortgage receivable	45,000.00	
		895,289.29
Fixed assets:		
Land, buildings, machinery, floating equipment, etc., at values as of 1919, subsequent additions at cost	$8,877,015.72	
Less reserve for depreciation and depletion	4,329,188.59	
		4,547,827.13
Deferred charges:		
Prepaid insurance	39,970.08	
Prepaid expense on uncompleted contracts	261,474.81	
		301,444.89
		$8,782,061.94

LIABILITIES

Current liabilities:		
Dividend payable January 3, 1933	$ 246,261.50	
Accounts payable, trade	371,327.21	
Accounts payable to affiliated corporations	15,908.46	
Accrued expenses and other liabilities	79,681.33	
Reserve for federal income tax	82,696.24	
		$ 795,874.74
Deferred credits arising from contracts		65,800.73
Reserve for insurance		160,179.95
Capital and surplus:		
Capital stock:		
495,426 shares of no par value issued	$4,954,260.00	
Less: 2870.4 shares reacquired	28,704.00	
	$4,925,556.00	
Surplus	2,834,650.52	
		7,760,206.52
Contingent liabilities:		
As guarantor of notes of affiliated companies	$290,000.00	
For notes receivable, discounted	36,803.76	
	$326,803.76	
		$8,782,061.94

SURPLUS FOR 1932

Balance January 1, 1932		$3,544,719.04
Income from operations for 1932		720,315.97
		$4,265,035.01
Deduct:		
Dividends for the year 1932	$1,347,688.25	
Provision for federal tax on income	82,696.24	
		1,430,384.49
Balance, December 31, 1932		$2,834,650.52

Rock Products News Briefs

General

DR. BAILEY WILLIS, Stanford University, California, a world authority on geology and earthquakes, believes most of the damage recently done by the earthquakes at Long Beach and Los Angeles could have been prevented. He states: "The earthquake-resistant competency of a building depends upon the unity of its outside walls and floors as parts of a rigid coherent whole. Structures which do not possess coherent unity and strength are not earthquake-resistant and constitute a menace to life and property. The requirement of rigidity demands that the structure when struck by a shock, shall deflect very slightly and return very quickly. A mere shiver is the ideal. This is an old idea but it has been brought within practical limits in the recent investigations. Any building has a definite swinging period which is fixed by its proportions and construction. The maximum stresses develop in a building when it swings in unison with the vibrations of the ground. Coincidence of periods produces resonance. If a building can be so rigid that it merely shivers, if its period is less than ½ second, resonance is not likely to occur. For buildings of five or six stories and probably up to ten or twelve stories in most cases, this degree of rigidity can be obtained by monolithic construction of reinforced concrete, or, where for any reason a steel frame is preferred, by imbedding the frame in concrete walls and floors, with suitable reinforcing steel and bonds throughout the structure. There is at present in current practice no other material than reinforced concrete or possibly reinforced brick that is strong enough or can be bonded properly to give the required rigidity."

♦ ♦ ♦

PRESIDENT ROOSEVELT told newspaper reporters, April 20, that the public works program now contemplated would be limited to projects that can be started immediately and finished by next spring—probably less than a billion dollars' worth. These projects must be practical and useful, and so far as possible, self-sustaining; for example toll roads, if highway construction is considered.

♦ ♦ ♦

HOME BUILDING statistics for March, according to F. W. Dodge Corp., showed an extraordinary gain over February (35%). The figures indicate that some funds withdrawn for hoarding were utilized for building and also that consumers consider present low prices as bargains. Residence construction in March totaled $16,021,000, as compared to $11,805,300 in February and $11,950,000 in January, a total of $39,777,200 for the first quarter. This compares with $85,130,200 for the first quarter of 1932.

♦ ♦ ♦

PROPOSED ROAD PROGRAM, backed by the American Association of State Highway Officials, calls for a federal bond issue of $250,000,000, divided as follows: For Federal aid highway construction for the fiscal years 1934 and 1935, $100,000,000; for bridges and railway grade crossing eliminations, $100,000,000; for secondary road construction under state supervision, $50,000,000. A 4-pp. circular issued by the Association states that 4,000,000 people were supported by highway construction in 1932. "This is not guess work—we handled the payrolls," the circular reads. Every state is organized to put men to work on this kind of construction.

♦ ♦ ♦

SILICOSIS continues to be an active subject. Through the efforts of Col. E. J. McMahon, executive secretary, St. Louis Quarrymen's Association, St. Louis, Mo., an attempt of the Missouri State Superintendent of Insurance to authorize a 44c. per $100 payroll increase in workmen's compensation insurance rates to cover the alleged silicosis hazard was prevented. Col. McMahon's effective work resulted in a reduction of this proposed increase to 1c. per $100 payroll.

Col. McMahon pointed out that silicosis comes from mineral dusts containing a high percentage of free silica; that of the 47 quarries in the State of Missouri 41 are limestone, 5 cement rock, or marble, 1 granite; that in one small granite quarry not over 1% of the quarry workmen of the state are employed. Col. McMahon made a thorough search of the literature on the subject and proved that authorities all agree that there is no silicosis hazard from limestone dusts. His work should prove helpful to quarry operators in other states who face the same problem.

On the other hand, the Illinois Supreme Court, February 23, decided against a silica producer whose attorneys argued against a provision of the state's occupational disease act, which provides that an employer shall be liable in a common law action for an amount not exceeding $10,000 to an employe whose health is injured as a result of wilful failure to adopt and provide reasonable and approved devices, means or methods for the prevention of occupational diseases. The defense argument was that this provision of the act was a violation of the state constitution and of the 14th amendment of the federal constitution. The court found the evidence sufficient to warrant the jury in finding the employe's illness was the result of wilful failure of the employer to comply with the statute; contributory negligence and assumption of risk by the employes were not available to the employer as defenses.

♦ ♦ ♦

NINETY-FIVE PER CENT of the men receiving relief for their families from the county or state prefer to exchange their own labor for it, but the remainder constitute a fringe willing to let the community support them. This view was expressed by Martin H. Bickham, originator of the "earned relief" program in Cook County, Illinois, after checking up on the operation of the plan, which to date has distributed approximately $6,000,000 in wages that otherwise might have been a dole, according to the *Chicago Tribune*. Champaign County, Illinois, has a system by which practically the entire $90,000 a month spent for relief is paid out in wages for work done by otherwise unemployed men. In Chicago, only about 10 per cent of the relief is so administered.

♦ ♦ ♦

BRIDGE CONSTRUCTION already begun at San Francisco, Calif., will mean a measure of prosperity for local rock products industries. Engineers' estimates say that approximately 500,000 bbl. of cement will be needed to complete the Golden Gate Bridge. The main span is 4200 ft. and there are two side spans, 1125 ft. and 475 ft. long. The cost, $32,815,000, is to be borne by six counties and no federal government money was borrowed for it. Some contracts were let the first week in March for the Bay Bridge which will connect San Francisco with Oakland. This will require about 1,000,000 bbl. cement and will take about three and one-half years to build. The total length, including a tunnel through Yerba Buena island, is 7½ miles. This is being built by the State of California Division of Highways and Bridges. Aggregates will be purchased from commercial producers.

♦ ♦ ♦

AGGREGATES for concrete will have a large place on the program of the annual meeting of the American Society for Testing Materials, Chicago, Ill., June 26-30. A committee consisting of R. W. Crum, director, National Highway Research Board, A. T. Goldbeck, director, Bureau of Engineering, National Crushed Stone Association, and F. H. Jackson, senior engineer of tests, U. S. Bureau of Public Roads, have submitted a plan for a symposium on the significance of tests of concrete and concrete aggregates. Among the rock products men who will contribute to the discussion are Duff A. Abrams, A. T. Goldbeck, J. C. Pearson, Fred Hubbard and Stanton Walker. The discussion is scheduled for Friday, June 30.

Rock Products News Briefs

Quarries

BETHLEHEM Mines Corp., Bethlehem, Penn., has recently issued a booklet describing "Bethrock", a graded dolomite and asphalt mix. The company is vigorously pushing this product, both for resurfacing work as well as new road construction.

♦ ♦ ♦

GENERAL Crushed Stone Co., Easton, Penn., will erect a bituminous concrete plant at Horseheads, N. Y., it is reported. The plant will have a capacity of 500 tons per 10-hr. day. It is also erecting a similar plant at Watertown, N. Y.

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DOLCITO Quarry Co., Birmingham, Ala., suffered considerable loss from fire at its Dolcito plant on April 11.

♦ ♦ ♦

TIDE Water Stone Co. has been organized and has acquired 700 acres of land near Clearwater, Fla. Both dimension and crushed stone will be produced. Machinery has been purchased and plant construction has started.

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ATLAS Olympia Co., San Francisco, Calif., reports a growing recognition for its bituminous material, "Atrock", throughout the state.

♦ ♦ ♦

Sand and Gravel

IN West Virginia a bill has been introduced which calls for a sales tax of 3% on sand and gravel and limestone and of 6% on sand and gravel from navigable streams.

♦ ♦ ♦

GOODWIN-GALLAGHER Sand and Gravel Corp., New York, N. Y., was purchased April 6 by the Colonial Sand and Stone Co., the *Flushing* (N. Y.) *Journal* reports. Bertram Thompson of Port Washington will be general manager. No immediate changes in personnel are planned, it is said.

♦ ♦ ♦

THE O'Mara bill, which provides for the licensing and regulation by the New York State Land Board of removal of building materials from state lands under water, is now pending before the state assembly. It has been supported by sand and gravel producers in the Lake Erie district, although it is possible that the area around Long Island may be exempted to protect oyster beds there. A bill which makes it illegal to take sand and gravel from state lands under water without license has already been passed by both the Assembly and the Upper House.

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STATE ACTION to control gravel prices for highways would save great sums of money for the state, J. L. Shiely, well known sand and gravel producer and ready mixed concrete manufacturer of St. Paul, Minn., declared before a state senate investigating committee recently. He told how two contractors had obtained control of a majority of gravel pits along projected state highways and forced down railroad rates and prices of commercial gravel. Much of Mr. Shiely's report was based on an investigation by a representative of the National Sand and Gravel Association in 1931. This testimony ended a two-month investigation, and legislation to correct this situation will now be prepared by the committee.

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A BILL which would permit the governor to "contract for the operation of a gravel pit and the removal of gravel from state-owned lands near Lockport, Ill., for a cash consideration or some other consideration deemed advantageous to the state" has been tabled by the Illinois senate. According to the *Chicago* (Ill.) *Tribune*, it was planned to trade an unworked pit for a pit which has been worked to its limestone bed by the Material Service Corp.

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LOUISIANA Public Service Commission has taken under advisement an application of sand and gravel producers for a non-mileage rail rate basis in shipping across the Mississippi river. Railroads contend the distance across the river should be figured into the rate scale in addition to an 8 c. charge.

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WAYNE COUNTY, Ind., operating on the county's share of the gas tax only, will carry out one of the largest graveling programs in its history in 1933, approximately 80,000 cu. yd. to be required, it is estimated.

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PERKINS Gravel Co. has opened a new plant near Perkins, Calif. The most interesting feature of this plant is that apparatus to save gold in the material processed has been installed. Besides sand and gravel, lime rock will also be produced.

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TAR SURFACE TREATMENTS for low cost roads require a tough aggregate as cover material in order to reduce crushing under traffic to a minimum, so that the original texture of the surface and the stability of the mat may be retained. Very fine sand or roadside material should not be used for blotting purposes because it has a tendency to produce either a brittle or an unstable surface. These statements and others of value in promoting the use of commercial aggregates are from a report of a co-operative study by the U. S. Bureau of Public Roads and representatives of the tar industry, published in *Public Roads* for March 1933.

Cement

REPUBLIC Portland Cement Co., San Antonio, Tex., announces election of the following officers: A. F. Sayers, president and general manager; Larry O. Cox, vice-president and sales manager; Sol Bromberg, vice-president; F. A. Smith, vice-president; and Ben R. Collins, secretary and treasurer.

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MARQUETTE Cement Manufacturing Co., Chicago, Ill., has announced a 5% increase in wages, effective April 1.

♦ ♦ ♦

B. F. AFFLECK, president, Universal Atlas Cement Co., Chicago, Ill., in a letter to members of his organization has urged a general indorsement of President Roosevelt's statement that "this country will endure and again prosper."

♦ ♦ ♦

BY A decisive vote, the Iowa House of Representatives recently refused to continue an investigation of charges of collusion against the state highway commission and Fred White, chief engineer, in connection with cement lettings.

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"THE STATE of Michigan has broken almost all of the contractors who have taken jobs on its highways because of the folly of contractors bidding against themselves in a most ruthless manner with the idea only to get jobs irresepctive of whether ends meet. Undoubtedly the cement manufacturers don't intend to be broken by a few barrels of cement sold to the state. The report says Michigan's requirement is but 48,000 bbl., which seems a small quantity to start up a plant for." So states an editorial in the *Crystal Falls* (Mich.) *Drill* in discussing the latest proposal to again start the state cement plant.

♦ ♦ ♦

PULVERIZED COAL in paper bags, containing 50 lb. each, is being delivered from a central pulverizing plant to a laundry in the South, according to *Power*. This recalls the suggestion made to the cement industry in ROCK PRODUCTS, December 31, 1932, that possibly some of the idle pulverizing equipment might be put to use grinding coal for commercial users of pulverized coal.

♦ ♦ ♦

A PROGRAM for saving the railways over a billion dollars a year, proposed by L. F. Loree, president of the Delaware & Hudson R. R., among the nine measures needed: reduced passenger and freight rates; abandonment of unnecessary mileage; improvement of railroad roadway, terminal facilities and practices. All of these would affect rock products producers; the first and last favorably, the second possibly unfavorably, where plants are located on little-used branch lines.

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to the week ending April 15:

New England

28890. **Limestone, broken or ground,** minimum weight 50,000 lb., to West Caribou and West Presque Isle, Me., from Ashley Falls, Lee, Mass. Present, 45c; proposed, 32½c. Falls Village, Mass., present, 46c; proposed, 32½c.

28930. To establish rates on **stone, crushed,** in bulk, in gondola or other open top cars (see Note 3), from Westfield, Mass. (Hampden Quarry), to N. Y. N. H. & H. R. R. stations named in I. C. C F-2795, on basis 10c per ton higher than rates currently effective from Branford, Conn. (Pine Orchard Quarry) as named in N. Y. N. H. & H. R. R., I. C. C. F-2795.

28963. **Crushed stone** (see Note 3), from Westfield, Mass. Per net ton: To North Oxford Mills, Mass., present, $1.05; proposed, 74c; To Webster, Mass., present, $1.10; proposed, 74c; to expire Sept. 30, 1933.

Trunk Line

30608. **Sand and gravel,** other than moulding, foundry, etc., C. L. (see Note 2), from Wyoanna, Penn., to Summit Switch, Penn., 69c. per net ton. To expire Sept. 30, 1933, and rate of 75c per net ton to apply, effective Oct. 1, 1933.

30635. **Sand,** other than blast, engine, foundry, glass, moulding, quartz, silex or silica, C. L. (see Note 2), from Philadelphia, Penn., to West Conshohocken, Penn., 70c. per net ton. Present rate 80c.

30639. **Crushed stone, coated with oil, tar or asphaltum** (amesite), carloads (see Note 2), from White Haven, Penn., to Montoursville, Penn., $1.80 per net ton. (Present $1.95).

30642. **Crushed stone,** carload (see Note 2), from Williams and Plymouth Meeting, Penn., to Atlantic City, N. J., $1 per net ton.

30646. **Quartzite, crude, unground,** carloads, minimum weight 60,000 lb. from Indian, Ont., to Cleveland, O., 31c. per 100 lb.

30663. **Ground limestone,** C. L., minimum weight 50,000 lb.; from Bellefonte, Pleasant Gap and Chemical, Penn., to Grenlock, N. J.: 15½c. per 100 lb.

30608. **Sand and gravel, other than moulding, foundry,** etc., C. L. (see Note 2), from Wyoanna, Penn., to Summit Switch, Penn., 84c. per net ton to expire April 30, 1933, and 90c per net ton to become effective May 1, 1933. (Present $1.00).

30611. To cancel commodity rate on **slate, crushed, ground, refuse or scrap, also stone chips or granules,** C. L. (see Note 2), from Cardiff, Md., Delta, Slate Hill, Penn., and Whiteford, Md., to Deschene, Que. Combination rates to apply. Reason—Investigation develops that plant at Deschene has been out of business for some time; therefore rates are obsolete.

30549. **Crushed stone,** carload (see Note 2), from White Haven, Penn., to Hollisters, Penn., $1 per net ton.

30628. **Sand and gravel,** C. L. (see Note 2), from Richmond, Va., to C. & O. Ry. stations—Louisa, Orange, Charlottesville, Waynesboro, Staunton, North Mountain, Clifton Forge, Hepler, Hot Springs, McDowell, Allegany, Va., and various. Rates ranging from 81c to $1.57 per net ton and from Hanover, Va., to the following C. & O. Ry. stations—Helmetoller, Hepler, Arritt, Jordan Bess, Natural Well, Kenkins Ford, Kincaid, Callison, Bacova Jct., New Siding and Hot Springs, Va., $1.57 per net ton.

30712. **Ground limestone,** C. L., minimum weight 50,000 lb., from Howes Cave, N. Y., to St. Lawrence Division of the N. Y. C. R. R., Lacona, N. Y., to Massena, N. Y., incl. Rates ranging from 9½c. to 12½c. per 100 lb.

30722. **Ground limestone,** C. L., minimum weight 50,000 lb., from Knickerbocker, Howellville, Rambo, Plymouth Meeting, Blue Bell, Devault and Swedesford Road, Penn., to Iron Hill, Elkton, Bacon Hill, North East, Charlestown and Principio, Md., 9c. per 100 lb.

30553. **Ground limestone,** carload, minimum weight, 50,000 lb., from Thomasville, Bricklyn, York, Hanover, Bittinger and East York, Penn., to Taconey, Penn., 10c. per 100 lb.

30680. **Crushed stone, coated with oil, tar** or **asphaltum,** (see Note 2), from White Haven, Penn., to Lock Haven, Penn., $1.95 per net ton. (Present, $2.90.)

30682. **Sand** (other than blast, engine, foundry, glass moulding and silica), and **gravel,** carload (see Note 2), from Alfred, N. Y., to Smethport, Penn., $1.05 per ton. (Present, $1.20.)

30557. **Stone, natural, crushed or broken,** uncoated or coated with tar, asphaltum or oil, C. L. (see Note 2), from Oriskany Falls, N. Y., to N. Y. C. R. R. stations, by providing that the rates on stone, natural or broken, coated, will be 10c per net ton over the rates on crushed stone, uncoated.

30690. **Crushed stone,** not coated with oil, tar or asphaltum, C. L. (see Note 2), from Jamesville, N. Y., to Rocky Glen, Penn., $1.50 per net ton. Present, $1.95.

30697. (A) **Crushed stone,** C. L., (B) **crushed stone, coated with oil, tar or asphaltum,** C. L. (see Note 2), from Bethlehem, Penn., to P. R. R. stations, Atlantic City, Collingswood, N. J., Dover, Del., Lansdowne, Penn., Martins Creek, Ocean City, Roxburg, Woodbury, N. J., and various. (A) Rates ranging from 90c to $1.70 per net ton. (B) Rates ranging from $1 to $1.80 per net ton.

30699. (A) **Crushed stone, uncoated,** C. L. (B) **Crushed stone, coated with oil, tar or asphaltum,** C. L. (see Note 2), from Bethlehem, Penn. (A) to L. & H. R. Ry., L. & N. E. R. R., D. L. & W. R. R. points, Dekays, Monroe, Andover, Buttzville, Baleville, Owens, West Carteret, Mountain View, Boonton, Gillette, Far Hills, Morristown, Mount Tabor, N J., and various. Rates ranging from $1 to $1.30 per net ton. (B) To L. V. R. R., L. & H. R. Ry., L. & N. E. R. R., C. R. R. of N. J., D. L. & W. R. R. points, Pittston, Pattenburg, Dekays, Monroe, Andover, Buttzville, Baleville, Owens, West Carteret, Bound Brook, Somerville, Califon, Kenvil, Dover, Hampton, Mountain View, Boonton, Gillette, Far Hills, Morristown, Mount Tabor, Horton, Netcong, Washington, Delaware, N. J, and various. Rates ranging from 85c to $1.40 per net ton.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

Central

35215. To establish on **sand and gravel,** C. L., from Copley, O., to Philo, O., rate of 125c per N. T., plus emergency charge. Present—140c.

35270. To establish on **crushed stone,** C. L., from Putnamville, Ind., to Riley, Ind., rate of 90c per N. T., plus emergency charge. Present—12c.

35278. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), and **gravel,** C L., from Oil City, Penn., to Greenville, Penn., rate of 80c. per N. T. Present—12c.

35317. To establish on **river sand,** C. L., from the tracks of the Sou. Ry. in New Albany, Ind., to Southern Ry. Youngstown Yard in Louisville, Ky., rate of 40c per ton, plus emergency charge. Present—60c, plus emergency charge.

35351. To establish on **crushed stone and crushed stone screenings,** C. L., from Marblehead, O., to Willard, O., rate of 80c per N. T. Present, 90c.

35126. To establish on **sand and gravel,** in open top cars, C. L., from Akron, O., to Cleveland, O., rate of 60c. per N. T. (60c. proposed to be established immediately in lieu of present rate 70c. on sand (other than common) and on gravel, and not to be established in lieu of present rate 54½c. on common sand until present rate is canceled or permitted to expire.)

35381. To amend Item 2575-A of C. F. A. L. Tariff No. 130-U, publishing 60% of sixth class rating on **slag, ground or pulverized,** in bags, min. wt. 50,000 lb., from points in the Pittsburgh District to points in C. F. A. and Trunk Line territories, by providing for the application of said rating on shipments in bulk or in barrels, bags or boxes, min. wt. 50,000 lb.

35412. To establish on **crushed stone gravel** and/or **sand,** coated or treated with oil, tar or asphaltum, carload, from Indianapolis, Ind., to points in Indiana. Proposed rates (in cents per N. T.) for distances of:

10 mi. and under..	96	175 to 200 mi.....	199
10 to 25 mi.....	96	200 to 225 mi.....	211
25 to 40 mi.....	107	225 to 250 mi.....	222
40 to 60 mi.....	119	250 to 275 mi.....	234
60 to 75 mi.....	130	275 to 300 mi.....	257
75 to 100 mi.....	142	300 to 325 m.....	268
100 to 125 mi.....	153	325 to 350 mi.....	280
125 to 150 mi.....	176	350 to 375 mi.....	291
150 to 175 mi.....	188	375 to 400 mi.....	303

Present—Class rates.

35067. To establish on **sand** (except blast, core, engine, filter, fire or furnace foundry, glass grinding or polishing, loam, moulding or silica), and **gravel** in open top cars; **limestone, agricultural, unburned; stone, crushed, and stone screenings,** in bulk, in open top cars, C. L., from Kenneth, Lake Ciecott, Ind., to Wilders, Ind., rate of 85c. per N. T. Present, 90c.

35413. To establish on **ground limestone,** in box cars, C. L., from the Bedford-Bloomington, Ind., district to Decatur, Ill., rate of 140c. per N. T., plus emergency charge. Present, 10c. cwt.

35445. To establish on **stone, crushed,** carload, from Shimer, O. (rates in cents per N. T.) (reductions).

	Prop.	Routes
Coney Island	105	1
Forestville	105	1
Hamlet	110	1
Bethel	115	1
Russellville	120	1
Felicity	120	2

*Intermediate to Bethel, O.

Route 1—N. & W. Ry., Clare, O., P. R. R., Carrel St., Cincinnati, O., C. G. R. R.

Route 2—N. & W. Ry., Clare, O., P. R. R., Carrel St., Cincinnati, O., C. G. R. R., F. & B.

35446. To establish on **gravel and sand** (other than blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica) in open top equipment, carload, from Erie, Penn., to Johnstown, Penn., rate of 160c. per N. T., plus emergency charge. Present, 230c. plus emergency charge.

35453. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass grinding or polishing loam, moulding or silica), and **gravel,** carload, from Attica, Ind. (Wabash Ry.) to Swanington, Oxford, Pine Village, Chatterton, Winthrop and Kickapoo, Ind., rate of 63c. per net ton plus emergency charge via C. A. & S. Ry. Present, 70c. plus emergency charge.

35454. To establish on **crushed stone and crushed stone screenings,** carload, from Kokomo, Ind., to points in Indiana.

	†Pres. Cwt.	*Prop. N. T.		†Pres. Cwt.	*Prop. N. T.
Advance	12	90	Westfield	11	80
May	12	90	Durbin	11	80
Lebanon	12	85	Lapel	11	85
Gadsden	12	80	Bloomer	11	85
Rosston	12	80	Anderson	11	85
Jolietville	12	80			

*Plus emergency charge.
†Sixth class.

Route: Via. N. Y. C. & St. L. R. R.-Noblesville, Ind.-and Cent. Ind. Ry.

Southwestern

562. **Silica sand.** To establish on silica sand, carloads, minimum weight 80,000 lb., from Skeen, Tex., rate of 30c to Chicago, Ill., 25c to Kansas City, Mo., and 20c. per 100 lb. to Wichita, Kan.; present Class D.

575. **Slate, crushed or ground,** from Hot Springs and Mountain Pine, Ark., to St. Louis, Mo., and East St. Louis, Ill. To establish rate of 11½c per 100 lb. on **slate,** crushed or ground, carloads, minimum weight 80,000 lb., except that the actual weight will govern when the car used is loaded to full visible capacity, but not less than 60,000 lb., from Hot Springs and Mountain Pine, Ark., to St. Louis, Mo., and East St. Louis, Ill., based 2c per 100 lb. less than the rate from Mena, Caddo Gap and Nooman, Ark.

589. **Sand, gravel and crushed stone,** between Missouri and Kansas points and Missouri and Kansas points. To add an exception to Section 2, Item 160, S. W. L. Tariff 162-E, reading: "Where single or joint line rates computed as above are rendered inapplicable under circuity limitations shown in Column 2, Item 290, rates to apply will be computed as per Item 200, using the single or joint mileage (as the case may be) via actual route."

625. **Stone, crushed,** from Dodson, Mo., to Kansas City, Mo. To add Dodson, Mo., as an origin point in W. T. L. Tariff 154-Q, permitting the Kansas City district rate to apply therefrom. No switching to be absorbed at Dodson, Mo.

Southern

832. **Sand,** C. L., Norfolk, Va., to Elizabeth City, N. C. It is proposed to establish rate on sand, C. L., from Norfolk, Va., to Elizabeth City, N. C., $20 per car, regardless of weight, plus 1½c per 100 lb., to apply in lieu of present rate of 90c per net ton.

834. **Sand,** carload, N. S. R. R. Electric Division stations to Interstate Railroad Stations. Present rate, combination. Proposed carload minimum weight 100,000 lb. (when 90% of marked capacity of car is less than 100,000 lb., such 90% of marked capacity will apply as minimum), except when cars are loaded to their visible capacity, the actual weight will govern, from and to the above named points, 216c per net ton.

835. **Sand,** carload, N. S. R. R. Electric Division stations to N. & W. Ry. stations in Virginia and West Virginia. It is proposed to revise the present rates on sand, carload, from N. S. R. R. Electric Division stations published in N. S. R. R., I. C. C. A-735 to N. & W. Ry. stations in Vir-

ginia and West Virginia in line with rates from Norfolk, Va., for account of the N. & W. Ry. Representative destinations shown below, in cents per net ton:

To	Pres.	Prop.
Ada, W. Va.	169	193
Bluefield, Va.	169	193
Boissevain, Va.	169	193
Coeburn, Va.	180	205
Norton, Va.	193	216

Illinois

35138. To establish on **stone, raw or crude, crushed, ground or pulverized** (unburned), in box car equipment, C. L., minimum weight 60,000 lb., from Marblehead, Genoa, Martin and Luckey, O., to East St. Louis, Ill., and St. Louis, Mo., rate of 280c per N. T. Present—450c.

7200. **Stone,** as described in Section 1 of I. C. R. R. Freight Tariff 13321-G. I. C. C. A-10242, from Thorton, Ill., to Genoa, Ill. Rates per ton. Present—$1.05. Proposed—90c.

7210. **Moulding sand,** carload (see note 3), but not less than 60,000 lb. from Wilmington, Ill., to Michigan City, Ind. Present, class E; proposed, $1.25 per ton plus emergency charge.

7233. **Sand and/or gravel,** minimum (see Note 3), but not less than 60,000 lb. from Joliet, Plainfield, Spaulding and Munger, Ill., to St. Augustine and Ellisville, Ill. Present, no through rates; proposed, $1.39 per net ton.

7248. **Crushed stone,** C. L., from Davenport, Iowa, to Chicago, Ill., Milwaukee, Wis., also points taking same rates and intermediate points. Present, $1.30; proposed, $1 per net ton.

Western

6146-P. Minimum weight: **Sand,** C. L., as described in W. T. L. Tariff 41-S, I. C. C. No. A-2243, from Millington, Oregon, Ottawa, Rochelle, Sheridan, Utica and Wedron, Ill., to points of destination in Ontario, Can., and C. F. A. territory to which rates are published in W. T. L. Tariff 41 from the origin points shown. Minimum weight: Present, determined by size of car used; proposed, when a carrier cannot furnish car of the capacity or dimensions ordered by shipper, after six full days' notice therefor has been given by the shipper, and for its own convenience furnishes car of greater capacity than the one ordered by shipper, it will be used on the basis of the minimum carload weight fixed in tariff or classification to apply on size of car ordered by shipper, but in no case less than the actual weight, provided the shipment could have been loaded upon or in a car of the size ordered.

7270-B. **Stone, crushed,** usual minimum weight to apply, from Dell Rapids and Sioux Falls, S. D., to Sioux City, Ia. Rates—Present, 110c per net ton plus emergency charge. Proposed, 90c plus emergency charge.

8232-1. Rates, **sand and gravel,** carload (see Note 2), but not less than 60,000 lb., from Eau Claire and Chippewa Falls, Wis., to Saginaw, Mich. Rates, present 349c per ton, plus emergency charge. Proposed, 328c plus emergency charge.

8397. **Stone, crushed,** C. L., minimum weight per W. T. L. Tariff 154-Q, from Dodson, Mo., to Kansas City, Mo. Proposed—Add Dodson, Mo., as an origin point in W. T. L. Tariff 154-Q, permitting the Kansas City district rate to apply therefrom. No switching to be absorbed at Dodson, Mo.

I. C. C. Decisions

14501 and 14791. Cement Fourth Section. Cement to Chicago, Ill., and St. Louis, Mo. Authority granted, in fourth section order No. 11185, subject to circuity limitations, to establish and maintain rates on cement, without regard to the long and short haul part of section 4, as follows: From Linwood, Ia., to Chicago, Ill., and points in the Chicago district, 10.5c.; from Linwood, Ia., to St. Louis, Mo., 12c.; from Hannibal, Mo., to St. Louis, Mo., 8.5c.; from Marquette, Mo., to St. Louis, Mo., 9.5c., and to maintain higher rates at intermediate points, provided (1) that the rates from intermediate points shall not exceed the rates from Linwood, Hannibal and Marquette, respectively, to the above destinations; (2) that rates from, to and between intermediate points shall not exceed the scale prescribed or approved in Atlas Portland Cement Co. vs. C. B. & Q. R. R. Co., 81 I. C. C. 1 and 83 I. C. C. 80, or Western Cement Rates, 48 I. C. C. 201 and 52 I. C. C. 225, as the case may be, or the lowest combination of rates subject to the act.

25020. Ohio Crushed Stone. The commission, in No. 25020, rates on crushed stone, gravel, sand and slag within the state of Ohio, and cases joined with it, has ordered the carriers to rewrite their rates on the road-building aggregates mentioned, within Ohio and from the borders on Ohio of Pennsylvania and West Virginia into Ohio, not later than May 15, in accordance with the P.S.M. 923 scale. That is one of the two scales used by the railroads in Ohio in making rates on the aggregates.

The commission found unreasonable the rates on crushed stone from Hillsville, Shaw Junction and Walford, Penn., and rates on slag from Midland and Sharpsville, Penn., and from Weirton, W. Va., to destinations in Ohio.

Intrastate rates in Ohio, on crushed stone, gravel, sand and slag in open-top cars, were found unjustly discriminatory against interstate commerce, unduly preferential of shippers in Ohio and unduly prejudicial to shippers in West Virginia and in western Pennsylvania.

The P.S.M. scale begins with a rate of 60c for distances up to 20 mi., becomes 65c at 25 mi., 85c at 50 mi., 95c at 75 mi., 105c at 100 mi., 115c at 125 mi., 125c at 150 mi., 135c at 175 mi. and ends with a rate of 145c at 200 mi. Nothing is added for joint-line hauls.

The scale, however, is not to be applied on distances of 40 mi. and less.

This proceeding also embraces No. 24597, Bessemer Limestone and Cement Co. vs. A. & B. B. et al.; and four sub-numbers, The Carbon Limestone Co. vs. Same; Lake Erie Limestone Co. vs. Same; The Standard Slag Co. vs. Same, and Union Limestone Co. vs. Same.

20039. Agricultural Limestone. The commission in No. 20039, National Mortar and Supply Co. vs. Ann Arbor et al., on further hearing, has prescribed a mileage scale to be used in the making of rates on agricultural limestone from Gibsonburg, O., to destinations in the lower peninsula of Michigan and on intrastate traffic within Michigan. The order requires the establishment of the interstate rates not later than May 19. No order was issued in connection with the intrastate rates, that matter being left to be worked out by the state commission and the railroads so that the state rates would harmonize with the interstate rates. Rates are to be on a minimum of 60,000 lb., the lime to be in bags or in bulk in box cars.

Rates on agricultural limestone in bulk, in open-top cars, from Gibsonburg were found unreasonable for the future to the extent they may exceed 90% of the scale to be used in making rates on the commodity in box cars, subject to a minimum of 90% of the marked capacity of the car, except that actual weight shall apply when the car is loaded to full visible capacity.

The commission found the rates unreasonable on past shipments, and awarded reparation.

Intrastate rates from Sibley and Monroe, Mich., to destinations in the lower peninsula were found unduly preferential of intrastate shippers and unduly prejudicial to the complaining shipper in interstate commerce to the extent they were lower, distance considered, from the Ohio point. The undue prejudice and preference are to be removed.

In determining rates on shipments in the past and for the future the commission said distances were to be computed over the shortest routes over which carload traffic could be moved without transfer of lading. Lines subject to the control of the New York Central, the report said, should be treated as a single line, the scale prescribed providing higher rates for joint lines than for single lines not exceeding 100 mi. The commission said surcharges authorized in the Fifteen Per Cent. Case, 1931, might be added to the prescribed rates.

The scale begins with a single-line rate of 65c a ton for the block of 20 mi. and less, goes to 95c for the block between 40 and 50 mi. and ends with a rate of 130c for the block between 90 and 100 mi. For all the distances up to 100 mi., 10c a ton is added for each block up to and including the one between 80 and 90 mi. For the last block of the single line scale only 5c is added for joint-line hauls.

The unified scale begins with a rate of 140c for the block between 100 and 120 mi., progresses by 20-mi. blocks to 160c at 200 mi., 185c for 300 mi. and 210c for 400 mi.

14843. Sand and Gravel Fourth Section. From Mason City, Ia. C. M. St. P. & P. authorized in fourth section order No. 11204 to establish and maintain a rate of 75c a net ton on sand and gravel, from Mason City, Ia., to Albert Lea, Minn., and to maintain higher rates from, to, and between intermediate points; provided, that rates from, to, and between higher rated intermediate points shall not exceed rates constructed on the basis of the distance scale shown in item 1625-C of Boyd's I. C. C. No. A-2231 and subject to other usual restrictions.

24936. Crude Sand. O. A. Smith Agency, Inc., vs. I. C. et al. Rates, crude sand with 2 to 3% of natural bituminous content, from Big Clifty, Ky., to Ironton, O., and Milwaukee, Wis., unreasonable to the extent they exceeded $2.10 a net ton to Ironton and $2.45 to Milwaukee.

25498. Silica Sand. McLain Fire Brick Co. vs. Pennsylvania. Rate, silica sand, Mapleton, Penn., to Irondale and New Salisbury, O., unreasonable to the extent it exceeded $2.40 a net ton. Reparation awarded.

13956. Plaster Fourth Section. Land and phospho plaster in the south. Carriers authorized, in supplemental fourth section order No. 10279, to make rates previously authorized, on land and phospho plaster between points in Florida and between those points and points in the south so as not to be subject to the equidistant provision of the fourth section, so as to permit grouping.

Proposed I. C. C. Decisions

25481. Limestone and Dolomite. Olds & Whipple, Inc., vs. N. Y. N. H. & H. Rate, agricultural limestone and dolomite, West Stockbridge and Ashley Falls, Mass., to East Hartford, Conn., applicable in some instances and inapplicable in others. Rate on shipments from Ashley Falls proposed to be found inapplicable. Proposed to be found that the applicable rate was and is $1.30 a net ton. Reparation proposed.

3790. Crushed Stone. From Indiana to Maroa, Ill. Proposed reduced rates, crushed stone, and related articles, Greencastle and Limedale, Ind., to Maroa, Ill., found justified. Order of suspension vacated and proceeding discontinued.

Orders Industrial Sand Cases Reopened

THE Interstate Commerce Commission has ordered the reopening of the Industrial Sand Cases of 1930, for further hearing at such time and place as the commission may direct. The effective date of the order has been postponed indefinitely.

Digest of Foreign Literature

By F. O. Anderegg, Ph.D.
Consulting Specialist, Pittsburgh, Pa.

Extraction of Magnesia from Dolomite. C. R. Platzmann describes the development of a method whereby the dolomite was calcined at 900 deg. for two to four hours. It was suspended in boiling water and then allowed to stand. The correct amount of $KHCO_3$ was added and the whole was shaken while introducing CO_2. After the reaction was complete, the lime and the impurities were filtered off and the solution brought to boiling whereby a basic magnesium carbonate was precipitated which, on calcination, yielded quite pure magnesia.—*Revue des Materiaux de Construction et de Travaux Publics.* (1933), No. 280, p. 11-14.

Influence of Phosphorus in the Raw Materials for Cement Manufacture. Henri Martin of Brussels points out that phosphorus usually occurs in raw materials as tricalcium phosphate which is stable in the rotary kiln under oxidizing conditions. On analysis, the phosphorus is carried down with the iron and alumina. If present in any appreciable amount, it should be carefully determined by special analysis so as not to throw off the raw mix. *Cement and Cement Manufacture* (1933), **6,** No. 2, p. 44.

The Viscosity of Cement During Settling. Karl E. Dorsch made an extended investigation on methods of determining the viscosity of neat cement pastes and ran into a number of complicating factors. The presence of the cement grains causing trouble, he withdrew solution from the paste and measured its rate of flow along a calibrated capillary under a constant suction. Sufficient neat cement paste was made up with a little less water than was required for normal consistency and well shaken in a tight metal container for five or ten minutes. Then it was molded into several porcelain crucibles holding about 50 grams. Great care was then taken to immerse the capillary to the depth of 2.5 cm. in the paste within 0.1 mm. After ten minutes the suction was turned on and the height to which the liquid rose in 30 seconds was noted and plotted against the time of standing. All cements showed similar curves, a rather rapid fall in fluidity for about one hour and then no change for perhaps 30 minutes, followed by another fall. An aluminous cement gave a shorter horizontal portion. The stationary period is ascribed to the formation of a more or less thickened envelope around the cement grains which slows down the hydration for awhile. Curves with pastes at different temperatures were parallel but with more rapid changes at the higher temperatures. With one cement, calcium chloride accelerated the stiffening reactions.—*Cement and Cement Manufacturing* (1933), **6,** No. 2 pp. 45-53.

Studies of Slag-Portland Cements. P. Dusesnil gives first some results obtained by M. Lecoeur, showing the effect of low temperatures as compared with standard temperatures on the rate of strength acquirement of portland cement *A,* the same mixed with 30% slag, *B,* with 70% slag, *C,* and with 90% slag, *D.* Working with 4 cm. cubes molded from plastic mortar, it was found that, while all the cements were adversely affected by the cold, *B* was almost as good as *A, C* only a little poorer, and even *D* made a respectable showing. It is important to grind the cements rather fine to get good results.

In tropical and semi-tropical countries, the presence of the slag helps to insure against the development of any false set, by increasing the time of setting. The solvent action of pure waters on the lime is important in many places. Slag cements contain less lime, e.g., *A* had 65% lime, *B* 58%, *C* 52% and *D* 48% lime. The concrete made from these cements should be rather resistant to solvent action, provided a properly compact concrete is obtained. Fine grinding again is helpful in the latter respect. Reference is made to a natural cement which in rich mixes has "shown itself to be practically undecomposable," although the mechanical strength was ordinary.

The slag cements have an advantage in requiring less mixing water for a given consistency and in being cheaper in price.—*Revue des Materiaux de Construction et de Travaux Publics* (1932), No. 279, p. 488-493; (1933), No. 280, p. 8-11.

Technical Stone Testing. The testing of stones should involve, first, a knowledge of their structure, which may be best determined petrographically. With this information, tests may be made more intelligently. If the rock is to be used in the crushed condition, it is essential to perform tests on crushed rock. The magnitude of the modulus of elasticity determines the resistance of the stone to impact when resting on a hardened surface. The usual method of testing by letting a weight fall on a cube from an ever increasing height seems to be as suitable as any. For testing crushed stone for resistance to compressive loads, pieces ranging from 30 to 60 mm. are placed two to three deep in a cylinder of 170 mm. diameter and the load of 40 metric tons (2580 lb. per sq. in.) applied through a piston of 168 mm. diameter. As soon as the given pressure is reached it is released and the rock is analyzed with sieves. This same apparatus can also be used to determine resistance to crushing impact. The resistance to flexural impact is useful information and can be obtained satisfactorily if a sufficiently large specimen is used, say 4 x 4 cm. with supports 7.7 cm. apart and a pendulum hammer giving an impact force of 10 cm. kg. These results were obtained by H. Burchartz, G. Saenger and K. Stöcke and printed as *Forschungsheft* 358 (1933), by VDI-Verlag G.M.B.H., Berlin NW7.

The Effect of Sugar in Mortars. The effect that sugar may have in increasing the strength of straight lime mortar has received a great deal of publicity, first in this country (Spain) and then all over the world and has suggested to many people the possibility of similar improvement in the quality of *portland cement* mortar and concrete by adding sugar. But in that case, the results have been disappointing wherever tried.

Juan Basso Oliva gives an interesting discussion of this problem. With a high calcium hydrated lime, an earth dry 1:3 mortar by weight was made up with standard sand and pounded into the molds.

	Tensile (lb. per sq. in.)		Compressive (lb. per sq. in.)	
	7 days	28 days	7 days	28 days
No sugar	0	53	0	137
6% sugar	64	89	57	181
6% honey	40	79	0	131

An appreciable improvement in strength was observed.

On adding sugar to portland cement, a very great increase in temperature was noted, resulting in a flash set and spoiling of any concrete, where present in appreciable amount, as has been observed on many different occasions. The following results were obtained with the addition of sugar to the extent of 0.5% of the weight of the cement, again at an earth dry consistency.

	1 day	3 days	7 days	28 days
Tensile	64	0	257	453
Compressive	0	570	1860	7000

While the early strengths were negligible, the 28-day strengths of the specimens, prepared under these particular conditions, exceeded those of similar specimens without sugar. But it must be emphasized that similar results may not be anticipated on pouring workable concrete.

On a cost basis, a 1:5 portland cement mortar gives three times the tensile strength and about ten times the compressive strengths of sugared 1:3 lime mortars at 28 days and for less money.—*Cemento* (Barcelona, Spain) (1933), **5,** No. 45, pp. 33.39.

Application of the Rankin Diagram to Cement Burning. Serban Solacodu reports the results of an extended study of cements ranging in iron oxide content from 5 to 12%, under the direction of Prof. Kühl. Nine groups of cements were burned and in each the ratio among the three acid constituents was maintained constant, while the amount of lime or per cent. "lime saturation"

was varied widely. Pure materials were burned in an electric furnace, unless the temperature required was about 1550 deg. C., when an acetylene torch was used.

Group	SiO_2	Al_2O_3	Fe_2O_3	CaO
I	4	1	1	30 to 70%
II	3.5	1.5	1	30 to 70%
III	3	2	1	45 to 70%
IV	2.5	2.5	1	44 to 66%
V	2	3	1	36 to 66%
VI	1.5	3.5	1	26 to 64%
VII	1	4	1	25 to 63%
VIII	0.5	4.5	1	24 to 62%
IX	0	5	1	23 to 60%

In groups I and II, and below 40% lime, very little hydraulic action was observed; from there to about 60% dusting occurred, and then a region of fast setting cements up to 65%. The strength then rose steeply until a lime saturation of 95% was reached, beyond which the strength fell off owing to the presence of free lime. The higher lime cements sintered, while the lower ones were fused. When the high lime cements in these two groups were fused, the strengths were seriously hurt. As the silica was lowered, the melting and sintering points also dropped.

In group III, the strengths dropped off appreciably and a second lower maximum was noted. The cements in the other six groups were all fused and two maxima were usually noted. These were interpreted as indicating two kinds of aluminous cements, the one with the higher alumina constant is similar to that sold under various trade names, while the other, higher in lime, attains its strength somewhat more slowly, but goes higher eventually.

The clinkers were studied petrographically and with X-ray, and it was found that the principal compound in the silicate cements giving highest strength was tricalcium silicate. The aluminous cements of the first kind fall in the $CaO{\cdot}Al_2O_3$-$5CaO{\cdot}Al_2O_3$-$2CaO{\cdot}SiO_2$ triangle and the best of these lie on that line where Rankin showed the first separation of gehlenite. The compounds are chiefly mono-calcium aluminate, beta-dicalcium silicate and dicalcium ferrite. The first of the three is the strength contributing compound.

The second kind of aluminous cements is found in the $3CaO{\cdot}5Al_2O_3$-$CaO{\cdot}Al_2O_3$-$2CaO{\cdot}Al_2O_3{\cdot}SiO_2$ triangle lying on a line joining, and being composed of, the first and last of these compounds. Part of the iron is present here as monocalcium ferrite, the rest combined with two moles of lime. The tricalcium pentaluminate is responsible for strength development in this class of cements.

Communications of the Cement Technical Institute of the Technical University of Berlin 1932 No. XLI, 106 pp. *Zement* (1933), **22**, No. 2, p. 17-22; No. 3, p. 33-38.

Changes in Gypsum During Cement Grinding. Paul Schachtschabel finds that, over phosphorus pentoxide, gypsum may be dewatered to about 0.76% at 113 deg. F., the change depending upon the humidity of the air in contact, as well as upon the temperature. The strong binding power of cement for moisture is a factor also. During this change, and even after heating for two months to 300 deg. the crystal structure of the hemihydrate remains unchanged. The hemihydrate water seems to be held in a zeolitic combination. At 390 deg. the rate of change over into the true anhydrite is very small, only becoming rapid at 570 deg. The latter form is very compact and dissolves slowly.

The conclusion is reached that a large part of gypsum is changed into anhydrite on grinding with cement clinker. If the clinker is ground with large balls and quite fine, and if the mills have no sieves, the change to the very reactive so-called soluble anhydrite is far advanced. The evolution of heat when this dewatered hemihydrate comes in contact with water speeds up the setting of finely ground cements. Smaller grinding balls, any expedient to keep the temperature of the cement low during grinding and an opportunity for the gypsum to be removed from the mill as soon as it becomes fine, are helpful.—*Zement* (1932), **22**, No. 4, pp. 45-49.

The Ageing of Cement Under the Influence of the Atmosphere. V. M. Anzlover stored 22-lb. samples of two standard portlands and of two high early strength cements in jute sacks and observed the effect of ageing upon water requirement, soundness, setting time, ignition loss, specific gravity and tensile and compressive strengths. Comparison was made with the same cements stored in a sealed container, which were unaffected by standing. Tests were made after 3, 6, 9 and 12 months of contact with the air.

The water requirement increased slightly with ageing, as did the soundness as determined in the Le Chatelier apparatus. The ignition loss increased with time, while the specific gravity decreased, the high early strength cements showing the more rapid change. The strengths were adversely affected, especially at the shorter specimen ages, and the compressive showed greater relative loss than the tensile. Indications point, however, to a probable recovery of strength on prolonged storage of the mortar test specimens in water.

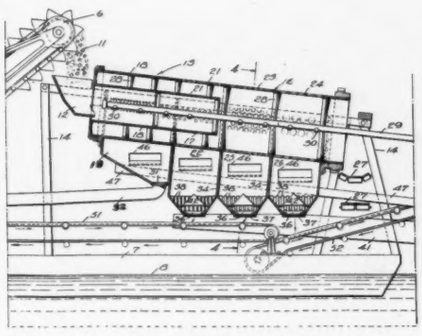
It is obviously the finest portions of the cement which are most affected by atmospheric moisture. Nevertheless, the slower but continuing hydration of the larger cement grains tends ultimately to develop strengths apparently similar to those obtainable with the fresh cement.

Patent Abstracts

The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington, D. C. Complete copies may be obtained by sending 10 c. to the Commissioner of Patents, Washington, D. C., for each patent desired.

Adding Hydrated Gypsum to Cement. The process covered consists of grinding the gypsum in a current of hot air so that the gypsum is dehydrated; then wetting it with sprays so that it will be hydrated as it is added to the clinker for final grinding. In this way, it is claimed, the gypsum is ground finer and is more uniformly distributed than would be possible with the raw gypsum rock. The inventor claims that the cement gains in plasticity and that there is a better control of the set.—*E. W. Rice, Assignor to Santa Cruz Portland Cement Co., San Francisco, Calif. U. S. Patent No.* 1,864,935.

Gravel and Sand Dredge Screen. The claims in this patent cover only the method of resoiling land that has been worked by gold dredges. But the specifications show an unusual arrangement of sizing screens in a very compact installation. The material is brought up by ladder dredge buckets and flows into a small inner screen which takes out sand and pea gravel. The larger outer screen takes out the sand from this mixture in its first sections and delivers it to a hopper (19) from which it flows through a pipe (32) to a classifier not shown. The remaining sizes of coarse gravel are screened off and go into the hoppers, from which they are taken away by conveyor belts below.—*S. A. Moss et al. U. S. Patent No.* 1,864,926.



Compact screen installation

Portland Cement Composition. The inventor says his cement composition is especially suitable for oil well work, having satisfactory setting properties and early high strengths at 200 deg. F. and higher temperatures encountered in oil well work. It is made from the usual raw mix by the addition of colemanite (calcium borate mineral) and oxy-chloride of lime.

The patent specification is long and the effects of adding these substances is shown by results of experiments. In one of the tables it is shown that the compressive 1-day strength of the cement (ground to 97% passing 200 mesh) was raised from 801 lb. to 1541 lb. per sq. in. by the addition of 1.6% of colemanite and 6% of oxy-chloride of lime. When ground to 86% through 200 mesh the strength was raised from 514 lb. 744 lb. by adding 0.5% of colemanite and 2.5% oxy-chloride of lime.—*Harold H. Steinour, assignor to Riverside Cement Co., Los Angeles, U. S. Patent No.* 1,852,595.

Possible Grinding Economies Would Save 25% in Power Cost of Portland Cement

By Nathan C. Rockwood

ON assumptions that 77% of the total power requirement for portland cement manufacture is expended in grinding operations (excluding primary crushers), and that a new type of mill or pulverizer will save 30% or better in power, the general adoption of this type of mill for all fine grinding operations in a plant would indicate a saving of 25% in total power consumption, besides cutting down the demand factor even a larger percentage because of saving in starting torque.

The mill referred to here is that described in the May 21, 1932, issue of ROCK PRODUCTS in the article "Improved Grinding Methods in the Lehigh Valley," and is known as the "B&W type B" pulverizer. The mill was developed by the Cement Division of the Babcock and Wilcox Co., New York City, and has been put through many tests under regular cement-mill operating conditions at the Cementon, Pa., plant of the Whitehall Cement Manufacturing Co. for over a year.

The earlier runs were made on raw material. The results were summarized in the article referred to: cement rock direct from hammer mills (1½-in. and under) was reruced to a fineness of 90% through 200-mesh with a power consumption of 9.3 kw.h. per ton, or about half that usually required (available figures show power consumptions of from about 5 to over 9 kw.h. per bbl., or 16 to 32 kw.h per ton). The average capacity of the mill on this raw material (mostly natural cement rock) was 35 tons per hour, with some runs as high as 39 tons. Some 60,000 tons of raw material was ground in the course of these tests, from which the cost of repairs and maintenance was computed.

The results achieved by this installation—an estimated saving in cost of grinding raw materials of 3.58c per bbl.—were sufficiently noteworthy to attract the attention of cement-mill operating men throughout the industry, and many visited the Whitehall plant to satisfy their skepticism. They found the management of the cement company ready to answer all questions and verify all test data.

From Raw Material to Clinker

The question invariably raised was: What can this mill do on clinker? To answer that question the identical installation was switched over from the raw to the finish grinding operation several months ago, and to date some 150,000 bbl. of clinker have been ground. The mill has demonstrated a capacity of approximately 100 bbl. per hr. of 90% through 200-mesh. The indicated saving in cost over the common method of grinding is 2.46c. per bbl. on the clinker grinding only. The total indicated saving where this pulverizer is used on both raw material and clinker is therefore about 6c per bbl., made up as tabulated.

The writer visited the Whitehall plant the first of March and was extended every courtesy in examining data available. Much of the data is obtained and assembled by a representative of the mill manufacturer who lives on the job, but the plant management makes all tests of cement and keeps a close check on all operating data.

RAW GRINDING

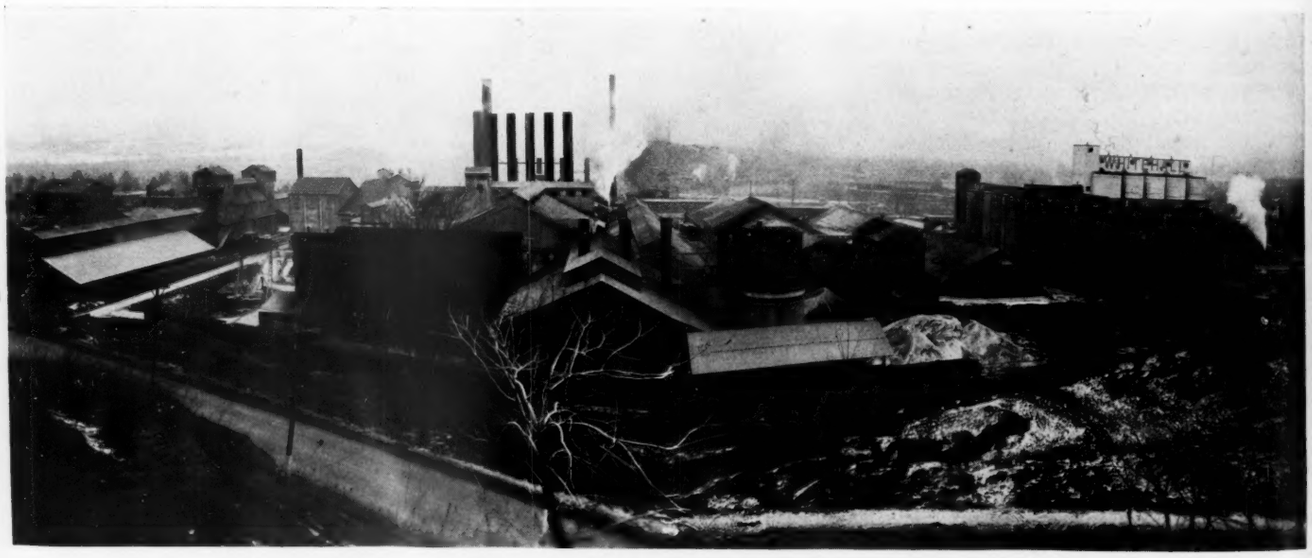
		Saving Per bbl.
Saving in power on raw grinding, 3 kw.h. @ 7 mills		2.10c
Saving in repair cost on raw grinding,		
Usual equipment	1.30c per bbl.	
Labor	.43 per bbl.	
	1.73 per bbl.	
B & W mill	1.5 per ton	
Labor	.5 per ton	
	2.0 per ton	0.60 per bbl.
Difference (saving)		1.13
Saving in operating labor, based on 5500-bbl. per day plant—4 men on old equipment—2 men on new mill @ 40c per hr. (48 hrs.)	19.20 / 5500	0.35
RAW GRINDING—TOTAL SAVING		3.58

FINISH GRINDING

Saving in power on clinker, 1½ kw.h. @ 7 mills		1.05
Saving in repair cost on clinker,		
Usual equipment	1.79c per bbl.	
Labor	.60 per bbl.	
	2.39 per bbl.	
B & W mill	1.00 per bbl.	
Labor	.33 per bbl.	
	1.33 per bbl.	
Difference (saving)		1.06
Saving in operating labor based on 5500-bbl. per day plant—4 men on old equipment—2 men on new mill @ 40c per hr. (48 hrs.)	19.20 / 5500	0.35

* * *

Saving in lubrication, based on Whitehall experience	0.25
TOTAL SAVING	6.29



General view of the Whitehall Cement Manufacturing Co. plant, Cementon, Pa.

Explanation of Cost Data

The power saving on clinker grinding is approximately 30% (on raw material 50%).

The maintenance cost is based on experience with raw materials at Whitehall, itemized as follows:

COST DATA ON WEAR AND MAINTENANCE OF MILL

	Wear in 1,800 hr.	Allowable wear	Estimated life
60-in. ring balls	0.37 in.	2½ in.	12,500 hr.
Top ring	0.25 in.	2 in.	16,400 hr.
Intermediate ring	0.25 in.	2 in.	16,400 hr.
* * * * *			
38-in. ring balls	0.60 in.	3 in.	9,300 hr.
Top ring	0.52 in.	2 in.	6,800 hr.
Intermediate ring	0.24 in.	2 in.	16,400 hr.
* * * * *			
Lower balls	1.05 in.	2½ in.	4,370 hr.
Intermediate ring	0.45 in.	2 in.	8,200 hr.
Bottom ring	0.28 in.	1¼ in.	8,000 hr.

Based on a 8,000-hr. cycle the repair and maintenance costs would be:

1 set of 60-in. ring balls @ $144	$144
1 top ring @ $375	375
1 set of 38-in. ring ball @ $148	148
1 top ring @ $375	375
2 sets of lower balls @ $144	288
New intermediate ring	965
1 bottom ring @ $310	310
1 ledge ring @ $150	150
Labor and dismantling	100
TOTAL	$2855

* * *

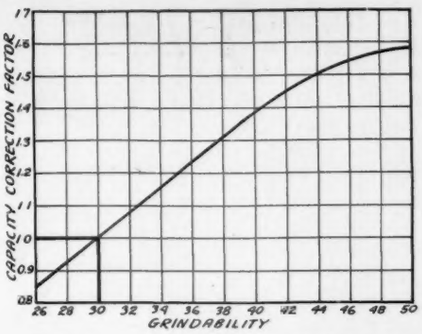
8000 hrs. @ 34 tons per hour (raw material=272,000 tons.

$$\frac{\$2855}{272{,}000} = 1.05\text{c. per ton} = 0.31\text{c. per bbl.}$$

* * *

The cost of repairs and maintenance for grinding clinker was arrived at in a similar manner. It will be noted that the figures used in the summary of cost savings are conservative—being less than the figures estimated. The loss of weight of grinding elements, per ton of material ground, is estimated at 0.0733 lb. per ton of clinker. Authoritative figures for tube or compartment mills are 0.11 to 0.32 lb. per ton of clinker.

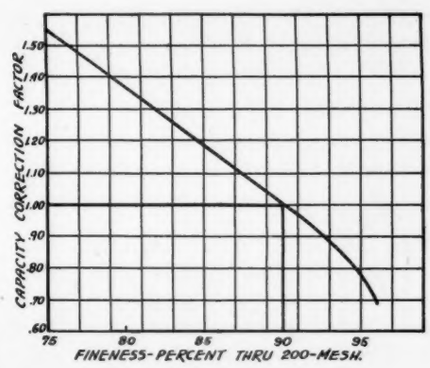
The figures on saving in power were obtained directly from recording instruments on both types of mill.



Relation of capacity to grindability

Test Data

The feed to the mill is accurately measured by a 30-in. Schaffer poidometer. The raw material feed was limestone that had passed through a No. 9 gyratory crusher, hammer mill and rotary dryer. The clinker feed was run-of-the-kiln clinker without previous crushing or grinding. These data are very complete as the following typical sample of a 23-hour run will show (these data are obtained continuously):



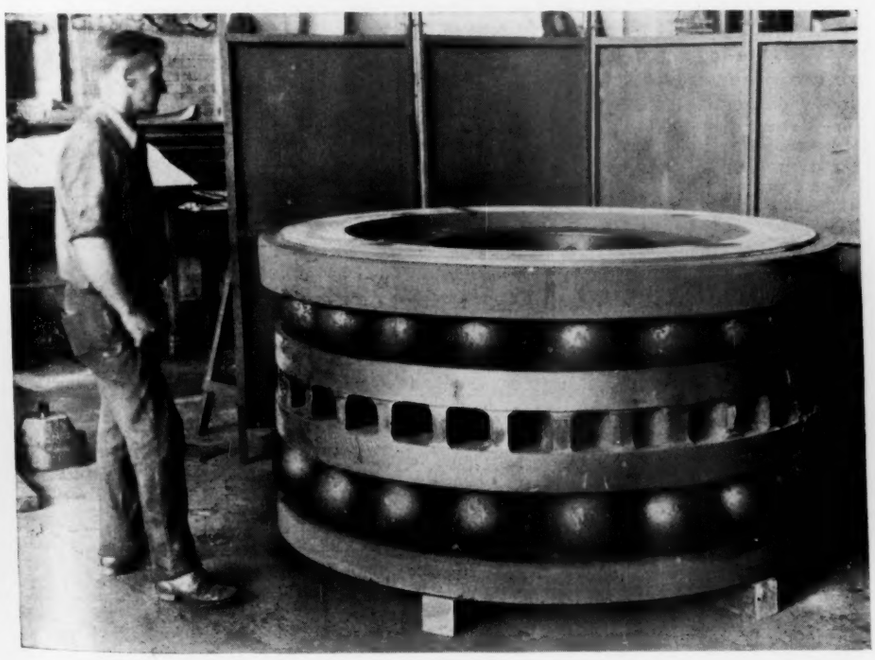
Relation of capacity to fineness of product

Test No. 221.

From	6:00 A. M.
to	5:40 A. M.
Hours	23.03
Production—tons per hour	19.45
Production—bbls. per hour	103.47
Kw. hrs./ton mill	17.51
Kw. hrs./ton El. + Sep.	3.35
Kw. hrs. Mill, El. & Sep.	20.86
Kw. hrs. Pump + Comp.	1.76
Kw. hrs. Mill. El., Sep., Pump & Comp.	22.62
Kw. hrs./bbl. Mill	3.30
Kw. hrs./bbl. El. + Sep.	.63
Kw. hrs./bbl. Mill, El. & Sep.	3.93
Kw. hrs./bbl. Pump + Comp.	.33
Kw. hrs./bbl. Mill, El., Sep., Pump & Comp.	4.26
Tons ground today	439.40
Tons ground to date	23860.41
Bbls. ground today	2337.51
Bbls. ground to date	126937.28
Fineness "A" mill dis.— 20	62.4 %
Fineness "A" mill dis.—100	25.0 %
Fineness "A" mill dis.—200	15.2 %
Fineness "B" Tails —100	16.2 %
Fineness "B" Tails —200	7.1 %
Fineness "C" Fines —325	77.1 %
Fineness "C" Fines —200	90 +%
Circulating load	1000 %
Temp. of feed	139 deg. F.
Temp. of "A" mill disch.	236 deg. F.
Temp. of "B" Tails	224 deg. F.
Temp. of "C" Fines	171 deg. F.
Spring press. lbs./ball 38	2250
Spring press. lbs./ball 60	1850
Ledge gap—vertical	4-in. cone
Pump disch. pressure	8.4
Hours to date	1568.26

From the data given it will be noted that the circulating load is about 1000% or 10 times the finished product.

The product of the mill is discharged to a 20-in. bucket elevator to a 16-ft. Sturtevant air separator, in closed circuit with the mill, as described in the previous article in Rock Products. The finished product is sent to bins by a 7-in. Fuller-Kinyon pump.



Grinding elements of new type mill

Character of Product

The first question that arises in the mind of a cement manufacturer is of course: How does the product of this mill compare with the product of tube or compartment mills grinding the same clinker? The accompanying comparative micron analyses answer this question for various typical runs.

Tensile strength tests of A. S. T. M. standard briquettes (six in each case) have been made continuously to compare the physical properties of the products of the two types of mill. For the 7- and 28-day strengths there is slight difference, if any, between the products. A Reed-Lewis analyzer for determining micron sizes has recently been added to the Whitehall company laboratories, and much interesting data are being assembled.

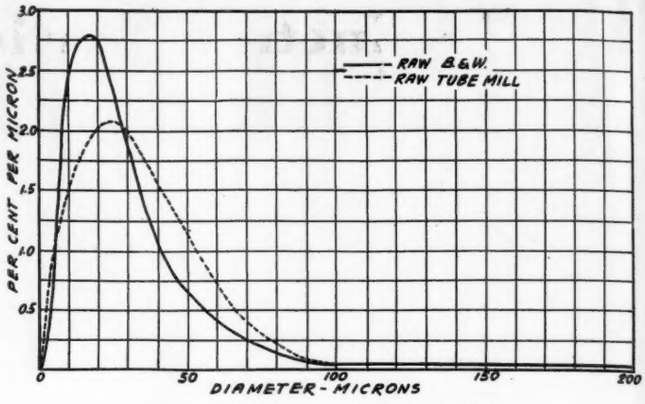
One advantage claimed for the B&W mill is *elasticity* of operation. Various internal adjustments can be made to change the grind of the product, and also the air separator can be further adjusted to discharge a product of various gradations of particle size. Such adjustments are apparently readily made in this mill.

Another feature of the B&W mill, shown in sample test data, is the low temperature rise in this system of grinding. This is of considerable significance because there are probably many instances where storage must be provided for no other purpose than to cool cement before shipment. Large stocks of finished cement are objected to by some manufacturers in these days of the strictest economy because the local tax rates on the finished product are of course higher than the rates on material in the process of manufacture, as clinker.

General

A description of the mill has been omitted as it is assumed that readers of Rock Products are familiar with it. This particular mill is known as a No. 60-38 (referring to the ring sizes). The grinding is done on the principle of a ball-bearing, the three sets of balls riding in separate rings. It is not a "high speed" mill in the sense that the old Fuller-Lehigh mill was, or mills of the ring-roll type. The shaft speed is 80 r.p.m., driving the balls at 40 r.p.m. The drive is a direct-connected (through bevel gears) General Electric slip-ring motor, which uses an average of about 275 kw. The material flows from one set of balls and rings to the other and the grinding is done between the ball and the ring on which it rides. The action of the mill is such that there can be little or no cushioning of the material as ground and the high efficiency of the mill is attributed to this fact—that the balls are always grinding the material in a very thin layer against the ring.

In connection with the development of this mill the research and engineering departments of the Babcock and Wilcox Co. have gathered a world of very useful and valuable data. For example there have been established values or factors for the "grindability" of various materials, so that capacities could be scientifically rated for these materials instead of guessed at, in the absence of actual experience with them. As the earlier work was done on coal, the grindability of a certain Pennsylvania bituminous coal was taken as unity or 100. All other materials are referred to this standard (The lower the grindability the harder to grind).



Micron analysis of raw material

Grindability Factors

Some of the grindability factors of materials rock products producers are interested in have been determined as follows:

Barytes ore	116
Dolomite	112
Fuller's earth	78-97
Feldspar	43
Gypsum (rock)	85-126
Gypsum (calcined)	89-115
Lime	84-160
Limestone	32-148
Mica	7
Oyster shells	63
Phosphate rock	43-103
Silica	24-55
Slag	17-46
Slate	72
Talc	74-84

From these figures one can readily understand why capacities of grinding equipment often fail to come up to guarantees. The tremendous range in grindabilities of limestone alone is evidence enough of the necessity of knowing the grindability factor before any estimate of capacities can be made. Similarly the Babcock and Wilcox Co. has established grindability factors for typical portland cement raw rock:

Coplay district	72
New Jersey district	67
Maryland district	47
Nazareth district	82
Ohio district	58
Alabama district	47
Missouri district	93
Kansas district	120

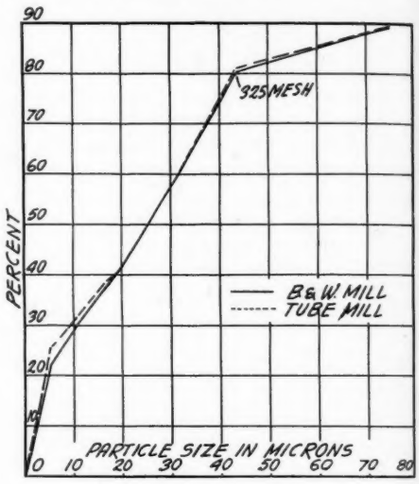
Grindability of the raw material used by the Whitehall plant is 75 (average).

Grindability factors for typical portland cement clinkers from mills in the districts noted are:

Nazareth district	34
New York State	36
Washington	37
Tennessee	39
Michigan district	40
Iowa district	43
Kansas district	46
Philadelphia district	49

Grindability of the Whitehall clinker in this scale is 27 to 31.

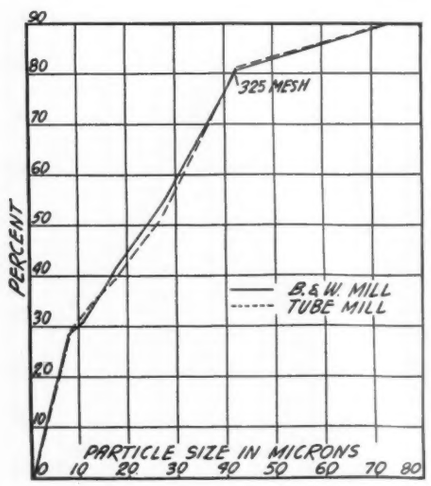
The research department of the Babcock and Wilcox Co. is now engaged in studying the effect of *abrasiveness* as well as grindability. Many abrasive materials are more easily ground than comparatively soft ones.



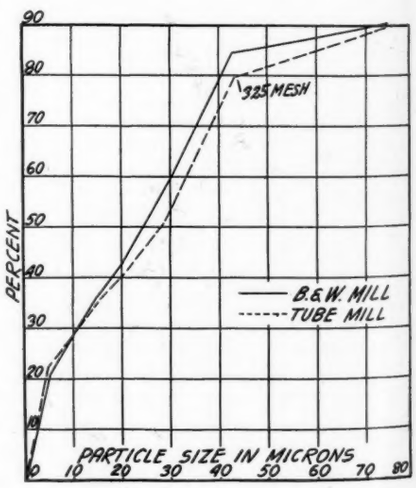
Micron analysis, clinker

The relation between grindability and mill capacity has been reduced to graphical form (Fig. 3) and would apply in general to any type of mill, although this chart is based on the performance of a particular type of mill.

The relation the percentage of minus 200-mesh material in the finished product to the capacity of the mill is shown in Fig. 4. This curve would also apply generally, in all probability, to all types of mills.



Micron analysis, clinker



Micron analysis, clinker

Production Statistics on Aggregates

THE United States Bureau of Mines has started to assemble statistical information on production and shipments of sand, gravel, crushed stone and slag, which will undoubtedly prove very helpful to the industry with a return to anything like normal conditions. The first release of these data, April 15, is interesting from a historical angle, but producers at the moment are more interested in prospective business than in contemplating the glories of the past and the miseries of the present. However, it is hoped the Bureau will see fit to continue the work, for such statistics of production and shipment have never before been available. The accompanying table gives a summary:

SUMMARY OF MOVEMENT OF AGGREGATE MATERIALS AND INDICATORS OF CONSTRUCTION ACTIVITY IN THE FOURTH QUARTER OF 1932 AND FOR YEARS 1932 AND 1931

	Fourth quarter			Calendar year to December 31		
	1932 Oct.-Dec.	1931 Oct.-Dec.	Change from last year	1932	1931	Change from last year
Rail shipments, Class I roads (a) (excludes nonrevenue railroad ballast)						
Sand and gravel, short tons (b)	6,954,000*	10,047,018	—30.8%	28,721,000	53,561,587	—46.4%
Crushed stone, short tons (c)	3,743,000*	5,021,867	—25.5	15,287,000	25,861,475	—40.9
Furnace slag, short tons	493,000*	1,203,747	—59.0	2,105,000	4,401,162	—52.2
Water shipments short tons (d)						
Sand and gravel, Pittsburgh District	275,735	644,583	—57.2	1,250,000	3,003,803	—58.4
Sand and gravel, coastwise from Long Island (e)	(f)	(f)	(f)	4,257,208	8,880,766	—52.1
Sand and gravel, Delaware River above Phila. (g)	(f)	(f)	(f)	2,020,700	2,749,781	—26.5
Crushed stone, Hudson River, Middle Section (h)	(f)	(f)	(f)	2,128,271	4,000,194	—46.8
Exports to all countries						
Sand and gravel, short tons	21,563	59,262	—63.6	96,015	217,870	—55.9
Imports from all countries						
Sand and gravel, short tons (i)	28,797	167,722	—82.9	212,458	420,721	—49.5
Total aggregates accounted for, short tons	11,465,000	16,917,215	—32.2	55,770,179	102,458,768	—45.6
Portland cement shipped (j) barrels	16,360,000	23,658,000	—30.8	80,579,000	126,465,000	—36.3
Construction contracts awarded						
Total buildings, floor space (k) 000 sq. ft.	30,071	68,429	—56.1	155,597	365,841	—57.5
Concrete pavements (i) 000 sq. ft.	20,363	13,734	+48.3	96,827	134,489	—28.0
General business activity						
Index of industrial production (m)	58	65	—10.8	58	73	—20.5

(a) As reported by the Interstate Commerce Commission. (b) Excludes glass and molding sand. (c) Excludes fluxing stone. (d) As reported by Chief Statistician, Board of Engineers for Rivers and Harbors. (e) Coastwise shipments from Hempstead Harbor, Huntington Bay, and Port Jefferson Harbor only. (f) Not reported quarterly. (g) Delaware River between Philadelphia and Trenton, internal shipments and local. (h) Hudson River, New York, Middle Section shipments downbound and local. (i) Excludes glass sand. (j) Bureau of Mines. (k) F. W. Dodge Corporation. (l) Portland Cement Association. (m) Federal Reserve Board recomputed to base 1928=100.0. *Preliminary.

Decreasing Percentages Moved By Railway

The accompanying statistics show the steadily declining percentages of the total output moved by rail:

CRUSHED STONE, SHORT TONS	1928	1929	1930	1931
(1) Total recorded production, Bureau of Mines[2]	74,384,490	76,174,770	74,293,090	65,811,520
(2) Revenue shipments, Class I railroads[3]	35,466,459	33,529,078	31,826,800	25,860,716
Per cent (2) is of (1)	47.7%	44.1%	42.9%	39.3%

[2] Includes concrete and road metal. Excludes railroad ballast and fluxing stone.
[3] As reported to the Interstate Commerce Commission. Commodity Class No. 351, "Stone, broken, ground and crushed." Does not include fluxing stone.

SAND AND GRAVEL, SHORT TONS	1928	1929	1930	1931
(1) Total recorded production, Bureau of Mines[4]	171,944,522	180,810,590	169,181,050	137,799,170
(2) Revenue shipments, Class I railroads[5]	85,667,157	81,408,069	73,983,841	53,562,437
Per cent (2) is of (1)	49.8%	45.0%	43.7%	38.9%

[4] Excluding glass sand, molding sand, and railroad ballast and fill.
[5] I. C. C. Commodity Class No. 350, "Gravel and sand (other than glass and molding)."

Win Certificates of Honor

OUTSTANDING instances of the exercise of courage and resourcefulness by workers in the mineral and allied industries in time of emergency were recently recognized by the award of medals and certificates by the Joseph A. Holmes Safety Association. Certificates of honor were also issued to companies which had operated over long periods of time without fatalities or lost-time accidents, or with remarkably low-accident records. Plants in this industry which received this recognition were the Ironton mine of the Alpha Portland Cement Co., Ironton, Ohio; United States Gypsum Co. mine at Plasterco, Va.; and the gypsum mine of Certain-Teed Products Corp. at Akron, Ohio.

Sand-Lime Brick: 1932

THE Bureau of Census announces that, according to data collected at the annual census of production and stocks of sand-lime brick, 52,853 M of such brick, valued at $433,118, were manufactured in the United States in 1932. The quantity represents decreases of 63.2% and 72.3%, respectively, as compared with 143,673 M reported for 1931 and 191,193 M for 1930, and the value shows decreases of 65% and 77.8%, respectively, as compared with $1,236,825 for 1931 and $1,950,709 for 1930.

Stocks on hand December 31, 1932, amounted to 9,602 M, representing decreases of 29.2% and 49%, respectively, as compared with 13,555 M on hand at the end of 1931 and 18,842 M at the end of 1930.

The figures for 1932 given in the statement below are preliminary and subject to revision.

SAND-LIME BRICK—PRODUCTION, BY QUANTITY AND VALUE

	Number of establishments	Production Thousands	Production Value	Stocks on Hand December 31 Thousands
United States:				
1932	31	52,853	$ 433,118	9,602
1931	31	143,673	1,236,825	13,555
1930	37	191,193	1,950,709	18,842

New Publications

Methods of Organizing and Conducting Industrial Safety Contests—Practices of a number of industrial organizations in stimulating interest of employes in plant safety activities are reported. Metropolitan Life Insurance Co., New York, N. Y.

Gypsum in 1931—Statistical data on gypsum production and manufacture in the United States. Bureau of Mines, Washington, D. C.

Diamond Core Drill Fittings—Commercial standard CS17-32 for diamond core drill fittings as adopted by the industry has been published in final form. A complete list of acceptors is given. Bureau of Standards, Washington, D. C.

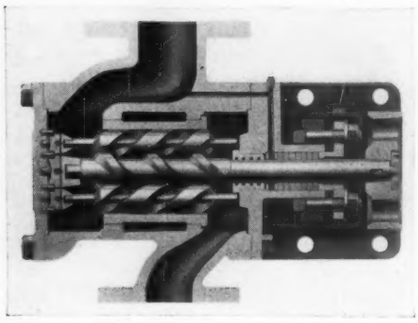
Nonmetallic Minerals in Canada — The following releases on production of nonmetallic minerals in Canada have been released: Stone Industry in Canada, 1931; Abrasives Industry in Canada in 1931; Fertilizer Industry in Canada, 1931; Manufactures of Nonmetallic Minerals, 1931; and Investigations of Ore Dressing and Metallurgy, in which is a section on investigations of nonmetallic minerals. This section includes data on tests of preparation and processing various products. All except the last of these were issued by the Dominion Bureau of Statistics. It was issued by the Department of Mines, Ottawa, Canada.

Examination of Eyes of Industrial Employes—Outlines experience of industrial concerns with various eye surveys, and a plan for examination of the eyes of workers. National Society for Prevention of Blindness, New York, N. Y.

New Machinery and Equipment

Rotary Displacement Pump

THE new type of rotary displacement pump is announced by the De Laval Steam Turbine Co., Trenton, N. J. According to the manufacturer it will run at speeds heretofore considered impracticable for displacement pumps.



Minimizes mechanical contact

Power is applied to a central or power rotor, which meshes with one or more sealing rotors of such form that they are propelled largely by fluid pressure, with a minimum of mechanical contact. Efficiencies of 80% to 90% have been obtained on tests, it is stated.

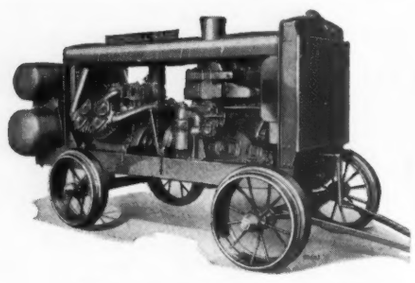
There is nothing in the mechanical construction to limit the operating speed, so that the pump operates successfully and quietly at the higher motor speeds, and even at turbine speeds, it is claimed. There are only three moving parts. Only one stuffing box is necessary.

These pumps are known as "De Laval-IMO" pumps. They are available in capacities ranging from ½ to 700 g.p.m. and for pressures up to 500 lb. per sq. in. Pumps for higher pressures and capacities can be supplied.

●

New Portable Compressor

THE Ingersoll-Rand Co., New York, N. Y., announces a new portable air compressor. The new machine adopts features of the two-stage stationary compressors, making them usable in portable units. The new compressor will deliver 23% more compressed air than previous models, the manufacturer states.



Adopts stationary features

The compressor in the new machine is a two-stage, air-cooled unit; has two-low pressure cylinders, arranged in a V and between them, in vertical position, a high-pressure cylinder. Danger of freezing is eliminated and size and weight of the assembly are lowered with air cooling.

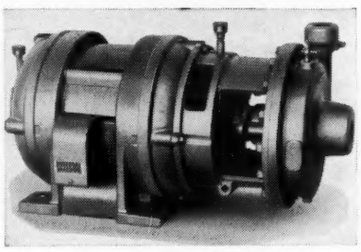
A Waukesha four-cylinder gasoline engine of the heavy-duty type with patented "Full-Power" combustion chamber, supplies the power. A clutch for easy starting is interposed between engine and compressor. Improved regulation for the compressor is provided. Speed of the machine is automatically reduced when unloaded.

The new two-stage, air-cooled portable is made in four sizes which have piston displacements of 125, 185, 250, and 370 cu. ft. per min. It is obtainable in a variety of mountings.

●

Motor Driven Pump

THE Allis-Chalmers Manufacturing Co., Milwaukee, Wis., has again extended its line of "SSU" motor driven single shaft, two bearing pumping units. It has now developed three sizes to work against heads up to 100 lb. and above and covering a range in capacity from 30 to 140 gal. per min.



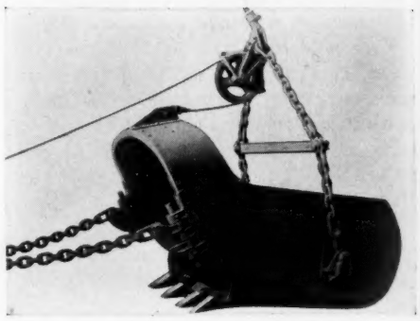
In 30- to 140-gal. per min. capacities

The pumps and motors are both built by the same manufacturer. A single shaft is used on which to mount the motor rotor and the pump impeller. This shaft is supported by two ball bearings, doing away with misalignment between the pump and the motor.

●

New Design in Dragline Buckets

THE Page Engineering Co., Chicago, Ill., announces a new and different form of bucket for dragline excavation. This new bucket is featured for its rocker-shaped hood which, it is claimed, eliminates the need of jockeying the bucket into position. It is also claimed to load within its own length, which makes it as efficient for deep pits as for surface work. The new bucket is called the "Page Automatic."



Feature is rocker-shaped hood

This bucket almost completely eliminates the forward projecting sides which have characterized all former buckets, thereby reducing possibility of bending; it makes possible reduction in weight without sacrificing strength, the manufacturer states; and when lowered into the pit it strikes on its forward hood and immediately rolls into digging position.

Also important is the improved draft hitch. The hitch plates are adjustable to suit the nature of the digging. Carrying and dumping of loads is accomplished in the same manner as previously, and ample clearance is provided that a full load may fall through without obstruction.

This new bucket is available in all sizes and for all classes of work.

●

Cold Patch Mixer

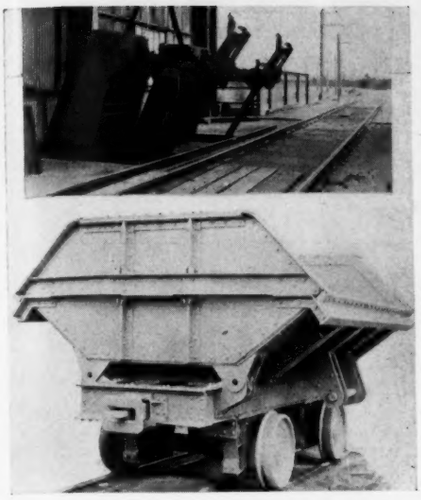
AGGREGATE PRODUCERS who also supply plant mixed asphaltic road surfacing materials may find use for the cold patch mixer recently announced by the Chain Belt Co., Milwaukee, Wis. This mixer handles either cut back or emulsified asphalt. The unit is of the pug mill type and is equipped with built-in heater.

It is claimed that the unit will mix a batch of emulsified asphalt in 20 sec., or with cut-back ashpalt it will do the mixing in 45 sec. The mixer has a capacity of from 4 to 6 cu. ft.

●

Quarry Car and Dump

A NEW "pan" type quarry car is announced by the Koppel Industrial Car and Equipment Co., Koppel, Penn. The car is tilted by a pneumatic dumping device placed beneath the track level in the crusher house. This equipment is claimed to speed up the dumping operation, and require only one operator. Compressed air provides necessary power for dumping. Gravity, plus a



Designed for mechanical dump

suspended counterweight, returns the car body to its carrying position. Other features claimed for the car include rigidily constructed sides at the top, reinforced body girths, and a special method of end bracing to prevent bulging.

●

Pneumatic Transport System

A PNEUMATIC transport system for cement, pulverized coal and other fine materials is announced by the Kennedy-Van Saun Manufacturing and Engineering Corp., New York, N. Y. The main unit of this system is a weighing tank, which is automatically filled and emptied by air. This tank is mounted on springs which permit the conical bottom to project into the space between the supports. An automatically operated discharge gate is connected to the discharge cone of the container. A flexible wear-resisting hose connects this gate with the stationary discharge line.

The flexible filling sleeve for the tank contains an automatic shut-off gate which is designed to operate in such a way that the material will flow into the tank after it has been emptied, and the flow will be discontinued after the container has been filled. During the filling a vent line is automatically opened to allow the air displaced by the in-rushing material to escape into the transport line. An automatic closure gate is built into the top of the container to seal it during discharge. After automatically seating the closure gate the compressed air enters the container and discharges the material. If obstructions build up in the transport lines the air pressure automatically builds up until the obstruction clears, when the pressure returns to normal, it is claimed.

Movements of the piston-operated filling gate and the main air valve on the top of the tank, as well as the movement of the piston-operated discharge gate and the vent gate at the bottom of the container are controlled by a pilot valve, which in turn is controlled by the upward and downward movement of the spring-mounted container. Air-operated pistons are adjustable for timing their movement so that the filling and discharge cycle may be regulated to suit individual plant needs.

Air consumption is claimed to be practically the same for all tonnages.

Beside transporting, the system also weighs, it is claimed. With a tachometer to count the dumps, the weight delivered by the system may be determined.

●

Announces A 2-Yd. Shovel

THE Northwest Engineering Co., Chicago, Ill., announces a new shovel. It is known as Model 80 and has a capacity of 2 cu. yd.

Both the boom and dipper sticks on this new shovel are of all welded construction. The boom is slightly cambered, and it is claimed that the independent crowd offers speed, simplicity and extra digging power new to the 2-yd. shovel field.

The shovel is powered with a 4-cylinder, heavy duty power plant operating at slow speed and capable of offering high resistance to the drag-down loads of rock digging. Low fuel consumption is claimed.

Positive traction on both crawlers even while turning, is claimed for the special crawler design.

All high speed shafts are mounted on self-aligning ball bearings.

●

Renovizing Power Theme of Chicago Exposition

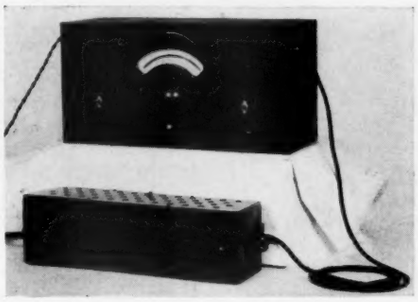
RENOVIZING power will be the theme of the sixth Midwest Engineering and Power Exposition to be held at Chicago during the week of June 25-30. During this week 20 engineering organizations, including the A.S.T.M., have perfected plans for conventions at Chicago. The week will be observed as Engineering Week by "The Century of Progress" Exposition.

●

Detects Magnetic Impurities

MAGNETIC IMPURITIES in asbestos, mica, glass, sands and other similar materials are easily detected and their extent measured by means of a new magneuic device announced by the General Electric Co., Schenectady, N. Y.

In its application to analyzing asbestos the device tests specimens containing up to 5% of magnetic ferric oxide impurities; operates on 110-volt, 60-cycle circuits; and can be used by workmen unskilled in electrical measurements.



Requires no special skill to operate

If a chemical analysis is made of a sample of asbestos, all of the iron and its oxides are determinable only as total iron present—no differentiation may be made between the injurious (magnetic, when used for insulation) and the non-injurious (non-magnetic) types. The new analyzer reports only the magnetic content.

The device consists of a differential permeameter and an indicating device. The permeameter consists essentially of a coil for producing a high magnetic field for magnetizing the specimen, and two equal secondary coils for measuring the magnetic effect. The specimen is placed in one of the secondary coils, thus disturbing their electrical equality. The effect on the indicator is proportional to the quantity of magnetic impurities present.

The indicator has two scales calibrated in terms of the per cent. of impurities in a 10-gr. specimen. The range of the first is up to 1%, and of the second up to 5%. Changing from one scale to the other is accomplished by means of a switch.

●

Automatic Stoker

AN AUTOMATIC underfeed screw stoker is announced by the Link-Belt Co., Chicago, Ill. This stoker is made in sizes for boilers of capacities from 10 to 250 b.hp.

Features claimed for this stoker are that its motor mounting permits direct connection to the forced draft fan; variable speed transmission regulates coal feed; it has a chrome steel screw conveyor, and it has automatic electric controls for operating at predetermined boiler pressures.

●

Light Weight Drifting Drill

THE Gardner-Denver Co., Quincy, Ill., announces a new light weight all-purpose drifting drill in the 2½-in. cylinder class, suitable for mine and quarry needs.

Improvements include elimination of the separate cylinder bushing, and a renewable bronze liner is pressed into the cylinder supporting the front end of the hammer which serves as the inner wall of the integral lubricator, though a line oiler may be used if desired.

The tubular type valve is said to give high drilling speed, low air consumption and to eliminate vibration. Air and water may be introduced either from the side or back of the drill. The throttle valve handle is retained without the use of nuts or bolts.

Design enables drilling close to the wall or back, where holes at extreme angles are needed. The drill weighs 154 lb. with standard mounting, can be supplied for round lugged or straight shank tappet steels, and for operating either wet or dry. Spring handles can be furnished for using it as a heavy duty sinker.

Cement Products

Precast Concrete Joists Have Large Market

GREATER MARKETS is a predominating thought in the mind of industry today. The concrete products industry is no exception. Success in achieving this has resulted to a marked degree with the development of concrete floor construction in which precast units are employed.

A study of this field has been made by many. An almost endless number of ideas have been evolved, some of which were the wildest flights of fancy. Others have been structurally sound but uneconomic. A very few have been both sound and economic for light duty floors, to which precast units are best adapted. Of this group, those which employ a precast joist to which the floor slab is cast as an integral part have led in economy.

Tremendous Market for Fireproof Floors

To obtain some idea of the possibilities of this market, from Dodge reports for the period 1925-31 inclusive we find there was an annual average of 436,000,000 sq. ft. of floors built in one-and two-family dwellings and housing developments. Making allowance for unreported dwellings, the total construction of this type probably amounted to 500,000,000 sq. ft. One lineal foot of joist can be figured for each two square feet of floor area, giving an average annual figure of 250,000,000 lin. ft. or approximately 2 lin. ft. of joist per capita. On this basis it is easy to estimate the possible market for concrete joists for any locality. Assuming it as possible to win 10% of the total business for concrete floors in 5 years and 25% in 10 years it is possible to obtain some idea of the importance of this development.

Some idea of the many attempts to create an economical fireproof floor may be gained from an acccompanying illustration, which shows details of systems embodying the basic principle of precast concrete joists. The patent number, name of patentee, and date of application are included with detail of features of each type of design. It will be noted that as early as 1898 an application was made which was specifically for a precast concrete joist. In 1902 E. L. Ransome incorporated a precast joist as an integral part of a concrete floor.

During all of these years little was accomplished with any of these systems, in so far as any appreciable business is concerned, until recently. This action, which has shown the possibilities for light duty, fireproof, concrete floors, has taken place in Kalamazoo, Mich., where the Kalamazoo Haydite Tile Co. has been quite successfully manufacturing and selling floor joists as developed by H. F. Young, details of which are shown in No. 15 of the accompanying illustration.

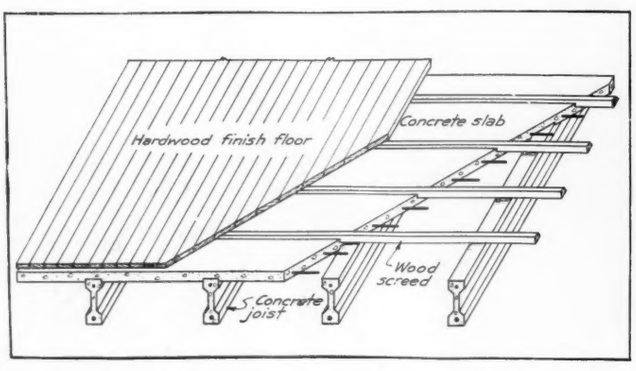
As an example of what has been done, on one job on which a Kalamazoo contractor figured and on which plastering was called for on the under ceilings of both the wood and the Lith-I-Bar floor construction, a difference of only 3c. per sq. ft. of floor was estimated. This amounts to from $20 to $25 for the average 5 or 6 room bungalow. Where under side of floors are not plastered the cost of the Lith-I-Bar type is about 12c. per sq. ft. higher than wood.

These calculations are based on 8-in. joists spaced 24 in. apart. Where spans do not exceed 13 ft. this spacing may be reduced to 30 in., thus reducing the cost for material and labor about 3c. per sq. ft. In this case the average first floor of the concrete joist type with ceiling unplastered could be built for the same cost as a wood floor with ceiling plastered.

The concrete joist floor also permits the use of some of the more economical floor finishes, such as colored concrete topping. These toppings, marked off into geometrical designs and given a high polish with floor wax, are being used in some of the finest homes, yet will save from 5 to 6c. per sq. ft. compared with common floor finishes, such as hard wood. The concrete joist type of floor can be finished with the usual types of materials, however.

Characteristics of Precast Joists

Concrete joists of the typical I-section, including reinforcement, weigh about 12 lb. per lin. ft. for the 8-in. and 15 lb. for the 10 in., when made of light weight aggregate. Heavy aggregates increase these weights about 40%. An 8-in. joist, 16 ft. long, made of light weight aggregate, will weigh about 200 lb., a weight easily handled by two men. Since they are placed in the same way as wood joists it is not difficult for those inexperienced with this type of construction to instal it, which is a factor in obtaining low labor costs.



Method of construction with concrete joists

Lith-I-Bar joist floor designed for house requirements

Choosing a System

In a paper read at the annual meeting of the Concrete Masonry Association, E. W. Dienhart, cement products bureau, Portland Cement Association, offered the following suggestions for consideration in selecting the type of joist to manufacture:

(1) "The joist should be light in weight; that it may be easily placed, easily handled in the factory, and that it will add the minimum dead weight to the floor.

(2) "The joist design should be attractive, to present a pleasing appearance when left exposed.

(3) "The joist should effect a satisfactory bond with the top slab, to take advantage of the compressive strength of the slab concrete.

(4) "Provision should be made for the passage of service connections through the joist."

In discussing the introduction of these joists by a concrete products manufacturer Mr. Dienhart continued, "It seems self-evident that the capital out-lay necessary for initial manufacturing equipment should be kept at a minimum at present. With that in view and with adequate consideration of production costs, I firmly believe the best method of approach to the manufacturing problem is through the medium of gang molds.

"Where a substantial ma ket for concrete joists is indicated, manufacturers should give serious consideration to the use of equipment designed for volume production.

"We firmly believe that if a concrete products manufacturer is so situated that he must select only one of the several avenues of revitalizing the concrete products industry and reestablishing it on a firm basis, his judgment will be well founded if his efforts are concentrated on the manufacture of precast concrete joists and in the development of the concrete floor."

And quoting Val Berry, manager of the Kalamazoo Haydite Tile Co., which has been quite successful in its promotion of the Lith-I-Bar system: "The joist business has been the one bright spot in a succession of dull construction seasons. A prospect for blocks is also a prospect for joists and we try to sell both products at the same time. Sales and promotion are effectively combined, and it has been found that the use of Lith-I-Bar often-times leads to the use of concrete masonry, and vice versa."

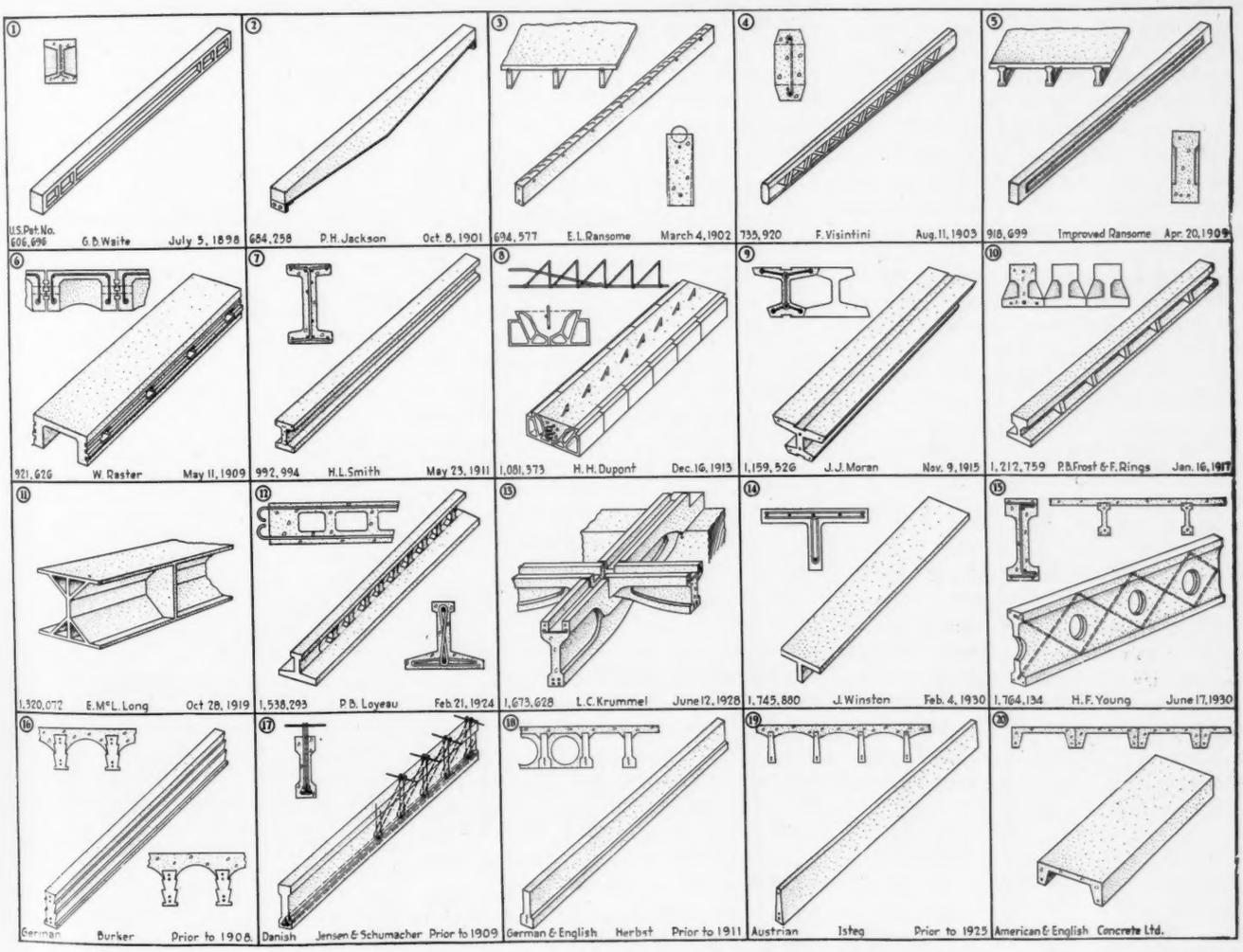
Confere e on Renewal of H e Building

A NEW and optimistic outlook has caused 30 leaders in the construction and allied trades to call a National Conference on the Renewal of Home Building to meet at Chicago, May 9 and 10. These leaders believe that the time is ripe to consider home building programs in all parts of the country. The conference is to be held to give this long dormant business the proper kind of an awakening.

The program is being planned with the purpose of building up a symposium that will re-assure the public on this whole subject from financing to furnishing.

"During this depression, literally dozens of large organizations have been designing and inventing all kinds of material, equipment, processes and plans for improving homes," says J. Soule Warterfield, chairman of the conference.

"There is much that is re-assuring and much that is interesting and much that is new and these are the things that we wish to bring out at the coming conference—both for those in the various businesses and for the public who are the prospects for all of us.



Showing essential details of floor designs proposed during past years

Proposed Changes in Standard Lime Barrel Law

And Other Important Subjects Will Be Discussed at the Fifteenth Annual Convention of the National Lime Association

A SUBJECT of major importance to the lime industry which is to be discussed on the floor during the coming convention of the National Lime Association, Ambassador Hotel, Atlantic City, N. J., May 23-24, is the consideration and adoption of definite recommendations to amend the present Standard Lime Barrel Act, looking towards clarification of the wording of the Act, and the inclusion of provisions for the standardization and simplification of lime containers of all types.

Now 17 Different Lime Packages

At the present time approximately 17 different types and sizes of containers are in use. A proposal has been made to reduce this number to eight; four for quicklime in its various forms; and four for hydrated lime. A poll of the industry is now being taken and while definite information is not yet available, it is understood that consideration is being given to the adoption of container sizes, each of which is a definite even fraction of the 2000-lb. ton.

In view of the confusion which the present large number of container sizes brings into the industry in the sale of its products and the unfair competitive practices which have developed, it would seem extremely wise for the industry to take the forward step proposed. In addition to the simplification in handling lime shipments, and the keeping of records in connection therewith, the standardization of sizes to a small but entirely adequate number, would undoubtedly introduce economies all along the line.

Manufacturers should make it their business to give this matter their serious and thoughtful attention and be prepared to advocate such a sound, progressive amendment during the annual meeting.

No Lime Manufacturer Should Miss These Discussions

While a definite announcement cannot be made at this time, negotiations are under way to have the Hon. James A. Farley, Postmaster General of the United States, honor the convention by his presence at the banquet on the evening of May 23, at which time he has been invited to present one of his interesting and helpful addresses. Mr. Farley's past connection with the building material industry fully qualifies him to speak on many subjects of vital interest to the lime industry.

Arrangements are also under way to have present a competent speaker who will discuss the various aspects of the recent Supreme Court decision in connection with the Appalachian Coal case. While it is too early to predict success or failure of the cooperative selling organization of the coal industry, the fact that such a plan has been given legal approval opens the way for similar undertakings in the lime industry. It offers to various groups within an industry the opportunity to reduce selling costs and has other advantages heretofore obtainable only through a merger of physical assets.

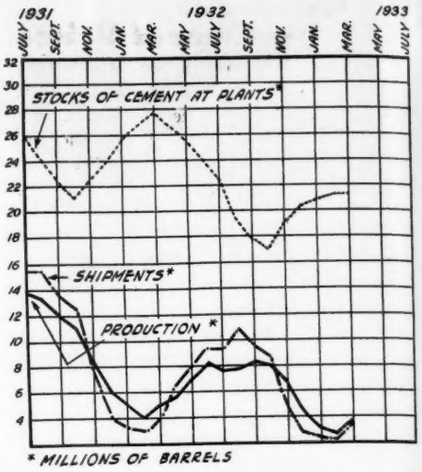
It is anticipated that definite Federal legislation designed to legalize the trade practice conference and to materially strengthen the power of the Federal Trade Commission will at least have been proposed, if not enacted, by the time of the annual meeting. If this legislation materializes, it will go a long way towards bringing about the elimination of unfair trade practices and introducing a measure of stabilization which should act as a real stimulus to business. It behooves every lime producer to watch the horizon for the appearance of this far-reaching legislation and then attend the industry's convention to discuss plans for unified action.

Agricultural Lime Demand Coming

It is anticipated that the scheduled discussion entitled "The Stability of the Agricultural Lime Market" will create considerable interest. Even though the farmer's income today is less than during the pre-war period 1910-1914, his consumption of agricultural lime has not fallen off in proportion to his decreased purchasing power. The several reasons for this are to be covered in detail by H. A. Huschke, director of the agricultural department of the National Lime Association. Mr. Huschke will also discuss the possibility of developing two new uses for lime which, if found successful, will open the door to increased lime tonnage.

A "New Deal" in plaster will be presented and supported by comparative schedules covering quantities of materials required and estimates of cost. Practical application of the information presented will be illustrated by using *everyday* examples to prove the economy of lime plaster. Data will be furnished in simple, workable form suitable for salesmen's use. Come and help yourself to information which will assist you in developing your share of the plaster tonnage.

Latest developments in the masonry mortar field will be discussed and no progressive lime manufacturer can afford to pass up the possibilities of increased tonnage.



Portland Cement Production in March

THE PORTLAND CEMENT INDUSTRY in March, 1933, produced 3,684,000 bbl., shipped 3,510,000 bbl. from the mills, and had in stock at the end of the month 21,298,000 bbl. Production of portland cement in March, 1933, showed a decrease of 24.0% and shipments a decrease of 11.7%, as compared with March, 1932. Mill stocks were 22.7% lower than a year ago.

The statistics here given are compiled from reports for March, received by the Bureau of Mines, from all manufacturing plants except three, for which estimates have been included in lieu of actual returns.

In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 165 plants both at the close of March, 1933, and of March, 1932.

RATIO (PER CENT) OF PRODUCTION TO CAPACITY

	March 1932	March 1933	Feb. 1933	Jan. 1933	Dec. 1932
The month	21.3	16.1	13.4	12.9	18.5
The 12 months ended	43.8	26.7	27.1	27.6	28.3

Special Cements in 1931—Final Figures

Figures on special cements in the United States in 1931 as reported by producers to the Bureau of Mines show the following:

High-early-strength portland cement produced in the Uinted States in 1931, as reported by producers, amounted to 1,366,468 bbl., and shipments from the mills, 1,422,633 bbl., valued at $2,278,236, an average value per barrel of $1.60. These statistics include the output of 16 plants located in 10 states; they may not represent complete data, as reports may be lacking from one or two plants manufacturing this type of cement.

Masonry cement, of the portland cement class, reported produced in 1931: 677,451 bbl.; shipments from the mills, 632,173 bbl., valued at $1,041,486, an average value per barrel of $1.65. These statistics represent the output of 24 plants located in 12 states.

Miscellaneous special cements (including so-called "oil-well," "high-silica," and "stainless" portland cements and cement manufactured under the trade name, "Super") produced in 1931: 429,822 bbl.; shipments, 404,161 bbl., valued at $674,399, an average value per barrel of $1.67.

Illinois Cement Prices

THE Governor of Illinois is engaged in a newspaper battle with portland cement manufacturers over prices bid on 3,300,000 bbl. for state highway work. Identical bids at delivery points averaged $1.62 per bbl.; three successive biddings were the same; manufacturers refused to make f. o. b. mill prices. Upon announcement by one bidder that his mills would close because of rejection of bids, the Governor made an offer to have the state lease the mill; the same offer was made to three other manufacturers. To date, according to Chicago newspapers, one company, Medusa Portland Cement Co., J. B. John, president, had replied as follows:

"The Medusa Portland Cement Company does not believe that the citizens of Illinois subscribe to the principle of government competition with private business, or that they are willing to saddle upon their state government responsibility for the profitable operation of a cement mill which private management has been unable to run under present conditions, except at a loss. It is my conviction that they are interested only in buying their cement at prices that are fair to the general public, to cement-plant employes and to stockholders. The present agitation results from the mistaken feeling that cement prices have been raised to unfair levels."

Following are net prices per bbl. paid by the State of Illinois:

Year 1919	$2.04
Year 1920	2.03
Year 1921	2.04
Year 1922	1.86
Year 1923	2.06
Year 1924	2.15
Year 1925	2.15
Year 1926	2.15
Year 1927	2.20
Year 1928	2.00
Year 1929	1.98
Year 1930	1.78
Year 1931	1.29
Year 1932	.94

The prices bid by the manufacturers March 27 produced, according to the calculations of the highway department, an average net cost to the state for 1933 of $1.62 per bbl. This price is from 16c. to 58c. per bbl. less than the net cost to the state in every year since 1919, with the exception of the years 1931 and 1932. The 13-year average net cost to the state was $1.98 per bbl.; 36c. per bbl. higher than the current bid.

Concrete Pavement Yardage

AWARDS of concrete pavements for March and for the first three months of 1933, as reported by the Portland Cement Association, are as follows:

	Sq. Yd. Awarded During March, 1933	Total Sq. Yd. Awarded to Date, April 1, 1933
Roads	1,478,003	7,886,691
Streets	212,902	628,265
Alleys	5,005	7,555
Total	1,695,910	8,522,511

Sand-Lime Brick Production and Shipments in March

THE FOLLOWING DATA are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States and Canada. The accompanying statistics may be regarded as representative of the industry.

Fifteen sand-lime brick plants reported for the month of March, this number being the same number reporting for the month of February, statistics for which were published March 25:

Average Prices for March

Shipping point	Plant price	Delivered
Sioux Falls, S. D.	....	$13.00
Medford, Mass.	$ 8.00	9.00-10.00
Saginaw, Mich.	10.00	....
Madison, Wis.	12.50	14.00
Mishawaka, Ind.	8.25	....
Flint, Mich.	11.50	13.00
Dayton, Ohio	9.00	10.00
Grand Rapids, Mich.	....	12.50
Milwaukee, Wis.	7.50	10.50
Detroit, Mich.	9.50	10.50
Toronto, Ont., Can.	12.00	13.50

Statistics for February and March

	†February	*March
Production	307,000	510,500
Shipments (rail)	80,300	14,500
Shipments (truck)	777,810	860.890
Stocks on hand	4,020,459	3,501,334
Unfilled orders	4,812,000	3,675,000

†Fifteen plants reporting; incomplete, four not reporting unfilled orders.
*Fifteen plants reporting; incomplete five not reporting unfilled orders.

Wisconsin Brick Co., Madison, Wis., furnished 800,000 sand-lime brick for the erection of a new U. S. Forest Products Laboratory there.

A "Letter to the Editor" Published in the "Michigan State Digest"

SIR: I note your article entitled "A Profitable Club" in your issue of Thursday, March 9, 1933, concerning the Chelsea cement plant. For your enlightenment I would like to call your attention to figures issued by the U. S. Department of Commerce. The cement industry in the United States operated on a basis of 28.3% of its productive capacity in 1932. We ceased operations here at Petoskey, August 1 last year, and just when we will commence again is still indefinite. The industry in Michigan sustained a tremendous loss last year and the year before.

Mr. Abbott is reported as saying he was unable to secure a fair bid on cement, and making references regarding the state's ability to supply cement to a job at a cost of $1.53 per bbl., as compared to a bid from private manufacurers of $2.04 per bbl. Recently we have quoted the state $2.04 per bbl. in cloth sacks f. o. b. cars Applegate, Mich., on 23,800 bbl. I particularly wish to call your attention to the fact that this price was subject to a 10c. per bbl. cash discount 15 days from the date of the invoice. There are four sacks to a barrel, and these cloth sacks are returnable, freight collect, at 10c. each, or 40c. per bbl. Our freight to Applegate is 61c. per bbl. Accordingly deducting the 10 c. cash discount, 40 c. for four cloth bags, and 61c. freight which we pay from our gross price of $2.05 will leave us a mill net of 93c. per bbl. if the state accepted our bid. Furthermore, we agreed to supply the job with cement at a price not to exceed $2.04 per bbl., but in the event the market price at that destination is lower than $2.04 per bbl. any time during the duration of the job, we agreed to supply the cement at the then lower prevailing market price.

We have one of the most modern cement mills in the country. It is right at the source of our raw materials and still the mill net above mentioned is considerably less than our cost.

As you, no doubt, are aware private industry, cement and otherwise, is at present sorely in need of help and encouragement. Just where is the state and national government going to derive its revenue to govern if industry ceases and unemployment increases? Most concerns and individuals are already finding it almost impossible to pay existing taxes.

PETOSKEY PORTLAND CEMENT CO.,
John L. A. Galster,
Treasurer and General Manager.
Petoskey, Mich. March 13, 1933.

W. Butler Duncan

W. BUTLER DUNCAN, 71, died at his home in New York, N. Y., on March 30. He was president of the Seaboard Sand and Gravel Co. and was an officer in a number of other companies. He was one of the foremost yachtsmen in the country, being an authority on yacht design and yachting rules.

Jesse W. Walker

JESSE WAGER WALKER, 90, Pittsburgh, Penn., died April 1. Mr. Walker was chairman of the board of the Duquesne Slag Products Co. and owned extensive holdings in the Concrete Products Co. of America. He was a former vice-president of the Phoenix Portland Cement Co. of Philadelphia, whose plants at Nazareth, Penn., and Birmingham, Ala., were acquired by the International Cement Corp. He was a graduate of the Polytechnic College of the State of Pennsylvania.

Michael J. Edgeworth

MICHAEL J. EDGEWORTH, president, Lehigh Stone Co., Kankakee, Ill., died suddenly March 25 at Miami, Fla., on his 75th birthday. Death was attributed to a heart ailment.

Mr. Edgeworth organized the Lehigh Stone Co. in 1906 in association with W. R. Sanborn (central regional vice-president of the Crushed Stone Association) and W. A. Bollman. Prior to his entry into the stone business he was engaged in railroad work.

THE INDUSTRY

Incorporations

New Orleans Cement Products Co., Inc. 1,000 shares of stock of no par value. John J. Voelkell, Jr., 1140 Fourth St., New Orleans, La., and Claude J. Kelly.

Dallas Concrete Co., Dallas, Tex. Capital stock $10,000. Incorporators: Pat S. Russell, R. Carnahan and Sawnie R. Aldredge.

Aspel, Inc., South Milwaukee, Wis. 500 shares common no par value authorized stock. E. C. Pommerening, H. A. Stoltenberg and J. H. Scholler, all of Milwaukee. To operate quarries, brickyards, asphalt, cement and plaster mills.

Crystal Spar Co., Inc., East Paterson, N. J. 2,500 shares no par. To deal in stone and cement.

Golden West Portland Cement Co., Oakland, Calif., was recently capitalized here at $150,000 by M. L. Parent and D. Laurent.

Tide Water Stone Co., New Port Richey, Fla. Incorporated for $40,000. Incorporators: Edgar John Phillips, Clearwater, and G. E. Moore, Tarpon Spring.

Brazos Sand and Gravel Co., Houston, Tex. Incorporated. A. R. Baker and W. Willis Cox.

Highway Crushed Stone Co., Boston, Mass. 1,000 shares at $100 each. President and treasurer, Harry Carpenito and Lena Nardons of Boston, and Ambrose Capone of Wakefield.

Glenns Valley Gravel Co., Indianapolis, Ind. Incorporators: John Wright Webb and Leonard Hohlt. To provide gravel for country roads.

Georgia Silica and Mineral Co., Etowah, Tenn. Capital $300,000. Incorporators: John D. Parks and S. G. Leon.

Quarries

Santa Barbara Rock Co., Santa Barbara, Calif., has been purchased by E. T. Carter and J. A. Zaruba.

Grant-Service Rock Co., Fresno, Calif., announces A. R. McMillan has been appointed general manager. He succeeds H. M. Estes.

Morrow County Stone Co. has opened a new quarry nearer Cardington, Ohio. Two crushers have been installed.

Raleigh, N. C. An increasing number of fertilizer mixing plants are using limestone filler in their fertilizer for this season in place of inert sand and other filler material. The change is the result of demand from farmers who prefer the limestone filler.

American Black Granite Co., Ashland, Wis., has opened a quarry at Wisco.

Consumers Co., Chicago, Ill., and its subsidiaries, have moved their general offices from 20 N. Wacker Drive to the Conway Building.

Basalt Rock Co., Napa, Calif., recently purchased three ready-mix trucks to better service demand for its concrete.

John Martin has installed a crusher at Andrews, N. C., and is supplying farmers with agricultural limestone.

Sargent Brothers, Leon, Iowa, have arranged with the county for the operation of the quarry at night by men on relief rolls. During the day the quarry will be operated as usual.

Mausdale Quarry Co. is opening a quarry at Williamsport, Penn.

Oakland, Calif. Claim made by Walter Havens of Wickham-Havens, Inc., for $1750 has been rejected. Mr. Havens charged that the removal of 3000 tons of rock from a quarry facing Grizzly Peak had caused damage to property owned by his company near the top of the quarry.

Sand and Gravel

F. W. Schroeder has opened a gravel pit at Stockton, Ia., from which he will obtain material for surfacing the county highway.

Colby Gravel Co., Granville, Ill., has filed notice of dissolution.

D. G. Hansen has opened up a gravel pit near Logan, Kan., from which he will obtain material for road work.

Industrial Mineral Products Sales Co. has started operation at Pittsburg, Calif., under the direction of R. M. Greathouse. The company will distribute sand.

San Jose, Calif. The city council has tabled an ordinance requiring sale of gravel by weight instead of yardage.

Muskingum River Gravel Co., Zanesville, Ohio, has moved its dredging equipment from the lower pool to the upper pool.

Kirkwood Sand and Gravel Co. has been restrained by court order from dredging the Meramec River north of Fenton, Mo.

Collins Sand and Gravel Co., Oxford, Kan., is offering its pit for lease on royalty basis.

Klondyke Sand Works, which has been inactive for several years, has started dredging sand for manufacture of beer bottles by the Alton Glass Works, St. Charles, Mo.

Morton Sand and Gravel Co., Chicago, Ill., has changed its name to Sand and Gravel Liquidation Co.

Cape Henlopen Sand Co., Lewes, Del., recently suffered damage to its plant by fire.

C. M. Johnston Sand and Gravel Co., Friars Point, Miss., recently had its sand dredge **Marion** destroyed by fire.

Lincoln Sand and Gravel Co., Lincoln, Ill., has launched a new sand barge on Lincoln Lake. A 25-ft. tow boat has also been launched recently.

Sparta, Ga. A bed of gravel suitable for road paving has been found near Linton and is being used on road work there.

Cement

Medusa Portland Cement Co. has resumed full operation of its Dixon, Ill., plant after 18 months of idleness, also its Wampum, Penn., plant.

Alpha Portland Cement Co. announces resumption of 50% operation at its Ironton, Ohio, plant.

Universal Atlas Cement Co. announces resumption of operation at plant No. 4, Northampton, Penn., with the staggered system of employment; also of production at its Hannibal, Mo., plant.

Wolverine Portland Cement Co. has started operation at its Coldwater, Mich., plant. The Quincy plant is also expected to start soon.

Pennsylvania-Dixie Cement Corp. plans to start operation of its Valley Junction, Ia., plant about May 1.

Edison Cement Co. has resumed operations at its New Village, N. J., plant.

Ash Grove Lime and Portland Cement Co. has discontinued production both at Chanute, Kan., and Louisville, Neb. Orders will be filled from stock.

Cowell Portland Cement Co., Cowell, Calif., has put its plant on a full production basis.

Monolith Portland Midwest Co., has started operation of its plant at Laramie, Wyo.

Southwestern Portland Cement Co. expects to continue operation of its El Paso, Tex., plant throughout 1933 without a shut-down.

Louisville Cement Co. planned to reopen its Speed, Ind., plant about April 15.

Beaver Portland Cement Co., Portland, Ore., resumed operation at its Gold Hill plant, April 3.

Ideal Cement Co. plans to reopen its Portland, Colo., mill sometime in May.

Ideal Cement Co., Denver, Colo., announces Claude K. Boettcher, vice-president, has been elected treasurer to succeed the late Harry C. James. The company reports shipments from plants of the company in the first quarter of 1933 were 10% ahead of shipments for the first quarter of 1932.

Riverside, Calif. Southern California cement companies have been refused adjustment of freight rates on cement which had been requested.

National Portland Cement Co., Brodhead, Penn., has asked bids on general contract for initial units of cement plant.

Metropolitan Cement Corp. plans manufacture of concrete conduits and kindred products at its plant in New Brunswick, N. J. An investment of more than $300,000 is planned, it is reported.

Santa Cruz Portland Cement Co., Santa Cruz, Calif., has been making improvements and adding machinery at its plant. A Hardinge mill is included in the new equipment.

Southwestern Portland Cement Co. announces election of T. K. Partridge as director to succeed the late A. Courchesne.

Dewey Portland Cement Co. has moved its office to the eighth floor of the Kahl Building in Davenport, Ia.

Fort Scott Hydraulic Cement Co., Fort Scott, Kan., reports operation at its plant has been resumed after a shut-down of 30 days for installation of new machinery. It also reports that shipments for the first three months of 1933 are far in excess of those for the same period last year.

Texas Division of the Portland Cement Association announces appointment of Stanley Campbell as its advertising manager.

Calaveras Cement Co., San Francisco, Calif., is opening a new quarry and building a four-mile standard gage railroad to it.

Northwestern States Portland Cement Co., Mason City, Ia., has announced plans to provide gardens and to defray the expenses of group insurance for its employes during temporary unemployment while the plant is closed.

Petoskey Portland Cement Co. plans to resume operation late in April at its Petoskey, Mich., plant.

The Hudson, N. Y., plant of the Universal Atlas Cement Co. has received an award for excellence in safety through records attained during the Eighth Annual Statewide Accident Prevention Campaign of Associated Industries of New York State, Inc. It will receive a bronze plaque.

Kosmos Portland Cement Co., Louisville, Ky., recently had two of its barges destroyed through fire originating on boats stationed some distance from them.

Lehigh Portland Cement Co., Allentown, Penn., has filed suit asking for refund of income taxes paid the United States in 1919 amounting to $402,307 and accrued interest.

Chariton, Ia. The state highway commission is operating a quarry on the Elwood farm on a two-shift basis with 30 men.

Greensboro, N. C. Edwin W. Pearce has been discharged as receiver for Kennerlite Quarries, Inc., and the corporation has been dissolved.

Gypsum

United States Gypsum Co. has added a night shift to its wall board department at the Oakfield, N. Y., plant. An increased demand for its wood veneer faced wall board is reported.

Lime

United States Gypsum Co. is starting eight new kilns as well as its rotary kiln at Genoa, Ohio.

Kelleys Island Lime and Transport Co. has resumed work at its White Rock, Ohio, plant.

Holmes Lime and Cement Co., San Francisco, Calif., is installing two new continuous shaft kilns and is carrying out a large modernization program at both its San Francisco and Felton plants.

Silica

Central Silica Corp. has been organized at Birmingham, Ala. Its plant will be at Collinwood, Tenn., and it will produce white silica and tripoli. The deposit is an open pit. Trucks will deliver from the pit to the plant where it will be sized by air classifiers. The annual production capacity is 20,000.

Other Rock Products

Michigan Alkali Co., Wyandotte, Mich., is installing another heavy duty safety "Jigger" vibrating screen as part of a modernization program.

Southern Alkali Corp. has started construction of a branch railroad to plant site at Corpus Christi, Tex., and plans are maturing for new alkali plant there.

Potash Company of America, Carlsbad, N. Mex., is sinking a 1,000-ft. shaft at its claim near there. Plans are being drawn for a refinery.

Barton County Rock and Asphalt Co., Lamar, Mo., has started its plant at Iantha.

Skagit Talc Co. has added equipment to increase production at its plant in Skagit County, Wash.

Eureka Mica Manufacturing Co., Waynesville, N. C., has completed installation of equipment at its plant and is in shape to produce a quality product in quantity. Grant Lowe, president, anticipates rapid improvement in business of the company.

J. Mummy and Co., Walnutport, Penn., manufacturers of slate products, has been reorganized and will do business under the name of Mummy and Marshall.

Elyria Magnesium Co., Elyria, Ohio, has been sold to the Cheney Chemical Co. of Cleveland.

J. B. McLean of Skagit Talc Mine has returned from St. Paul, Minn., having negotiated with the Longview Fibre Co. for a $14,000 order for Skagit talc.

Dodds Granite Corp., Milford, Mass., is being refinanced and reorganized.

Freeport Sulphur Co., New Orleans, La., has let contract to McWilliams Dredging Co. for dredging approximately 3,300,000 cu. yd. of material at site of proposed plant in Plaquemine Parish.

Personals

Walter Wechlo, formerly with the Southwestern Portland Cement Co., is now superintendent of the Holmes Lime and Cement Co. plant at Felton, Calif. He succeeds Mr. Holdinghausen.

B. L. Boye has been elected president of the Asphalt Institute, succeeding William H. Kershaw. Mr. Boye is in charge of asphalt and fuel oil activities of the Standard Oil Co. of New York.

Charles Boettcher, president of the Ideal Cement Co., Denver, Colo., celebrated his 81st birthday on April 8.

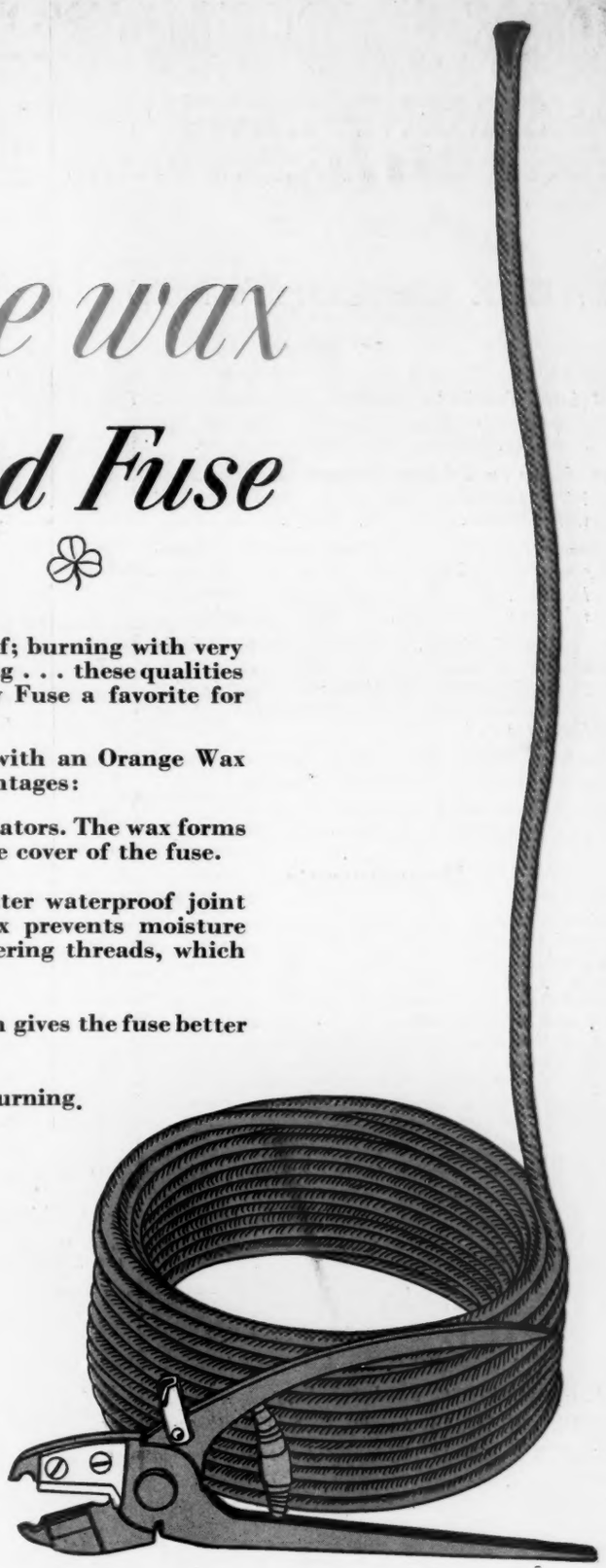
Ulysses Lockwood is retiring from his gravel business, Williams Bay, Wis. His son, Wesley, is assuming management.

Ben D. Reynolds, president, Independent Gravel Co., Joplin, Mo., was married to Mrs. Lillian Edgar Hallar, April 3.

A FAMOUS FUSE WITH A NEW IMPROVED FINISH

Orange wax

Clover Brand Fuse



Durable, flexible, unusually waterproof; burning with very little smoke and free from side-spitting . . . these qualities alone have made Clover Brand Safety Fuse a favorite for underground work.

Now this famous brand is available with an Orange Wax finish, which adds these distinct advantages:

1. **Better crimping surface for detonators. The wax forms a smooth, yielding surface on the cover of the fuse.**
2. **When crimped, it provides a better waterproof joint between cap and fuse. The wax prevents moisture absorption by the outside countering threads, which might be carried into the cap.**
3. **The color of the orange wax finish gives the fuse better visibility underground.**
4. **Makes for greater regularity in burning.**

Orange Wax Clover Brand Fuse provides improved quality at the same price. It is offered to meet any and all conditions underground, where fuse can be used. The Ensign-Bickford Company, Simsbury, Conn.

THE ENSIGN-BICKFORD CO. SAFETY FUSE EST. 1836 SIMSBURY, CONN.

SF 14

ENSIGN-BICKFORD SAFETY FUSE

Rock Products

With which is Incorporated **CEMENT and ENGINEERING NEWS** Founded 1896

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